AMES

BASIC TRAINING MANUAL FOR STANDARD TYPEWRITERS

Written and Compiled

by

Murray Harris

The author of this manual has spent many years teaching office machine servicing to students in vocational schools. In addition to his classroom work, he has a thorough background in the retail field of the office machine industry.

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A
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PRODUCT

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A BRIEF HISTORY OF THE TYPEWRITER

As early as 1713 men were trying to develop a machine to write or make impressions. Most of the inventions were based on the "wheel printing principle, and most were found to be impractical.

In 1873, in Ilion, New York, the typewriter industry was born; and its father was Christopher Latham Sholes. Mr. Sholes invented the first commercially successful and marketable machine. Remington was its first manufacturer, and the first typewriter was eventually called Remington Model 1.

The first machines were "blind writers" – the typist could not see the copy. Later came visible writing.

Prices varied from $15.00 to $60.00 – some as high as $100.00.

In the early period, the major manufacturers of typewriters were Germany, England, and the United States.

The first shift key model typewriter (small and capital letters) was in 1878.

In 1883 Remington and Caligraph were the only type bar machines on the market.

The automatic ribbon reverse came in 1896.

There were typewriters invented for different languages.

There were typewriters with interchangeable types.

One Chinese typewriter had 4,200 characters.

There was a toy typewriter for children in 1903.

There was an aluminum frame machine in 1906.

The first portable typewriter with a complete four-row standard keyboard came in 1920.

There was an electric typewriter as early as 1921.

From 1874 to 1923 approximately 300 different brands of typewriters were put on the market. Some were successful for a year – some for a lengthier time – but soon came mergers. Many typewriter companies merged, and thus was born many of our better known companies. The four major brands of typewriters on today's market and their dates of origin are as follows: Remington, 1873; L. C. Smith (Smith Corona), 1888; Underwood, 1895; and Royal, 1906.

Some of the early manufacturers of typewriters in 1923 were the following:

Corona	A.E.G.	*Olivetti*
L.C. Smith & Bros.	Dayton	Titania
Ideal	Royal	Triumph
British & Best	Senta	Invicta
Smith Premier	Torpedo	Underwood
Remington	Mercedes	Oliver
Hammond		

CUSTOMER RELATIONS

A typewriter serviceman will spend one half of his time in a customer's office, so it is vitally important that a good relationship is established between the serviceman and his customer. You will want to present yourself and conduct yourself in the best way that you can. You probably will be making inspections, answering service calls, making deliveries and sometimes even sales calls.

FIRST – You must look as well as you can. Ninety percent of the people you deal with never see your shop or office machine store. They can only notice your appearance and draw their own conclusion as to what kind of business you represent. A white shirt and tie is standard dress not only for salesmen in this business but also for the servicemen. Check your shoes, too. Make sure they are clean and in style.

SECOND – If you use a car or service truck for service calls, always obey the rules and regulations for parking on the customer's lot. Don't abuse the parking regulations.

THIRD – When you enter an office, check with the receptionist or the person in charge, perhaps the office manager, or whoever placed the call. Never just barge into an office and start to work on the machine that you think is giving the trouble. Do not take advantage of the office and the fact that you are going to help them. You can be replaced.

FOURTH – When you are shown the machine that is giving trouble or that is due for inspection, check with the operator before beginning your work. If she is typing on the machine, let her finish without interrupting her. Ask her what the complaint is and get complete details as to the trouble she is experiencing. It is always a good policy to move the machine to another location where no one is working or where you will not disturb anyone before beginning your work. This will give you more room to work undisturbed, also.

Always put a shop towel or pad down in your work area. Better check the foot screws on the machine before you move it. If one of these happens to be loose, and you slide the machine across an expensive desk, you might find your pay envelope short the next week because of a refinished desk top.

While in the customer's office, be careful of your liquids; such as, ammonia, lacquer thinner, and oils. Ammonia is a good cleaner in the shop, but in a public office you cannot be sure who might be injured by fluid odors and fumes. Take care not to overturn a liquid.

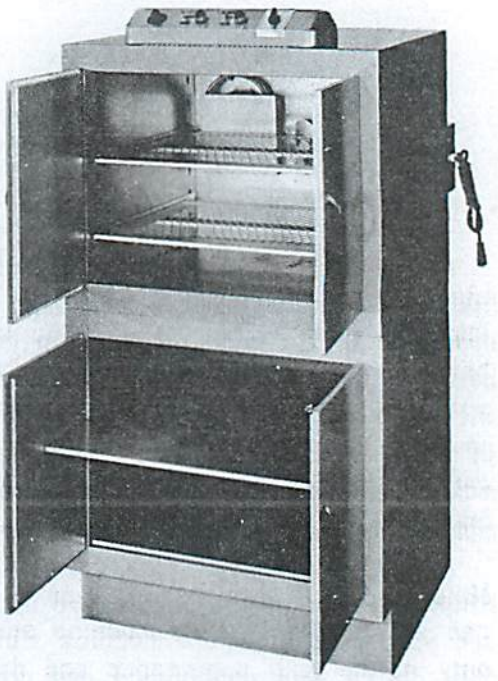
FIFTH – Keep your tool kit in good condition. Have it neat and orderly. Keep all tools where you can get to them easily. You can tell a mechanic by his tools. Prepare a tool roll with the tools you will need for that job prior to leaving your shop. Two tool rolls is a good idea, one for special tools and the other for the essential ones; such as, screwdrivers, spring hook, oiler, brushes, and those needed for inspection jobs.

SIXTH – Clean up thoroughly after you have completed your work. Check desk tops for oil, liquids, and dust which may have dripped or been brushed from the machine. Check for forgotten parts. If you have changed the ribbon, throw the old one in the waste basket. When you return the machine to the operator, have the margins set where you found them – also the touch control reset, the line selector set again at 1, 2, or 3, and the ribbon set on black. Replace the machine to its original location. If you were called in on service, let the operator check the machine before you leave to see if the trouble has been corrected. This will save you a repeat call.

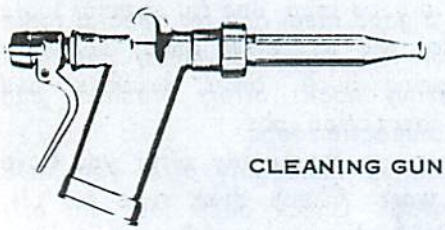
All of these suggestions will improve customer relations – thus they will put more money in your pocket.

EQUIPMENT
used in servicing machines

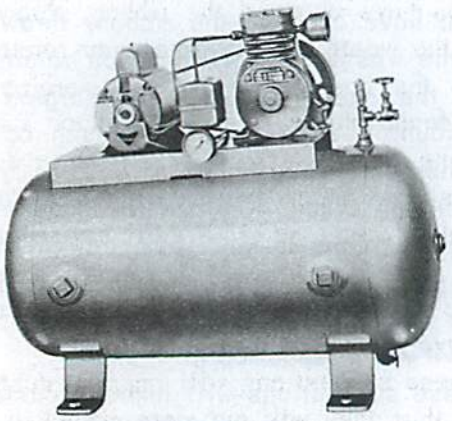
CLEANING SYSTEM



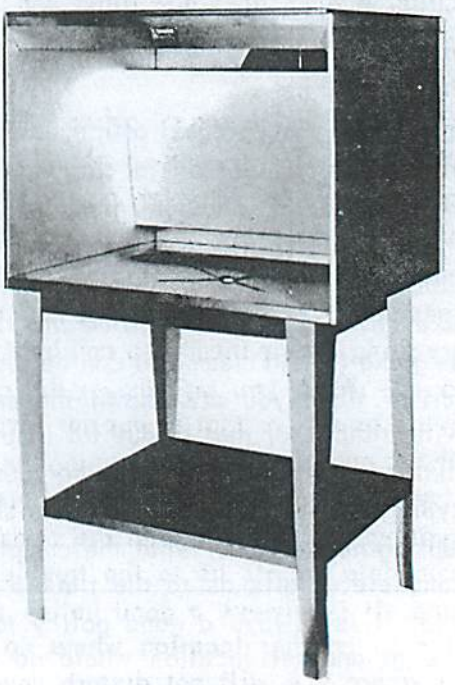
PAINT AND DRYING OVEN



CLEANING GUN

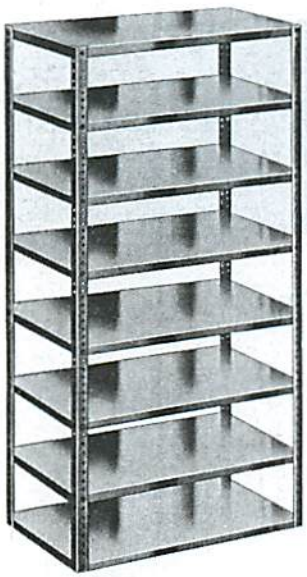


COMPRESSOR

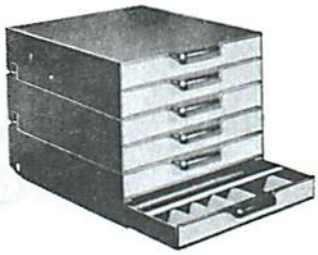


SPRAY BOOTH

SHOP FURNISHINGS

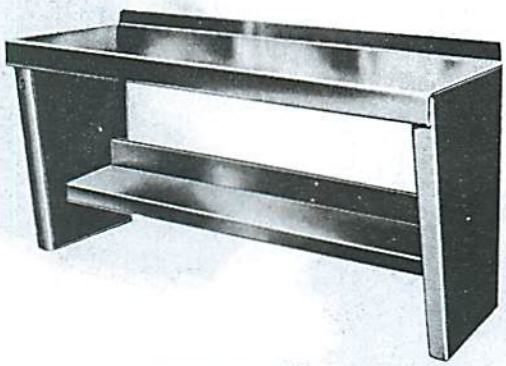


SHELVING

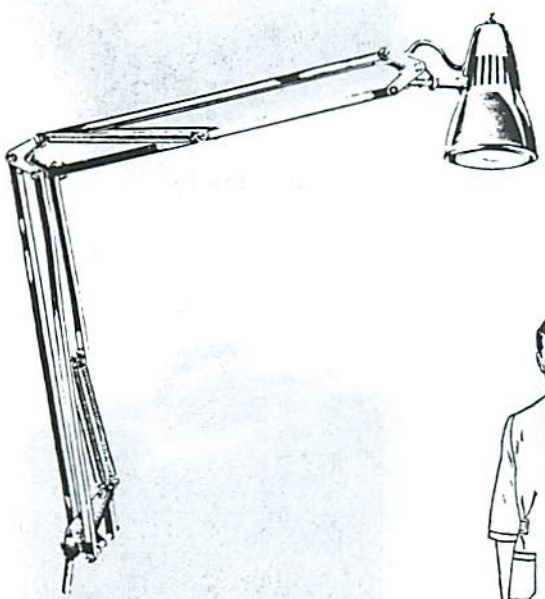


PARTS CABINET

STOOL



WORK BENCH



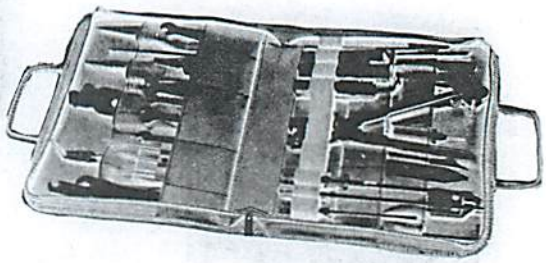
BENCH LAMP

SHOP SMOCK

TURNTABLE

TOOL KITS
for the Typewriter Serviceman

No. 134
(Pocket Size)



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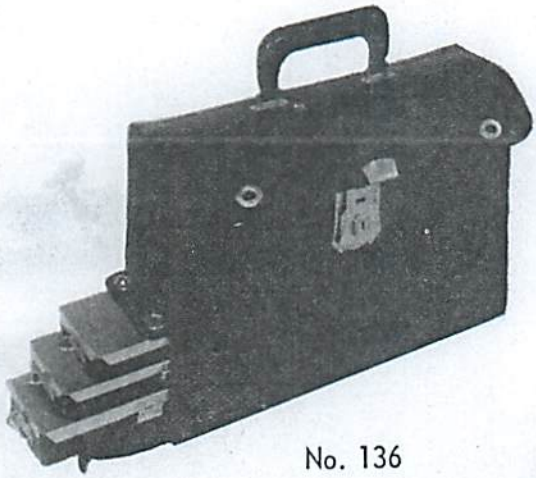
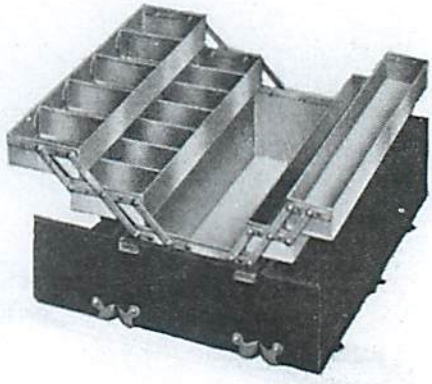
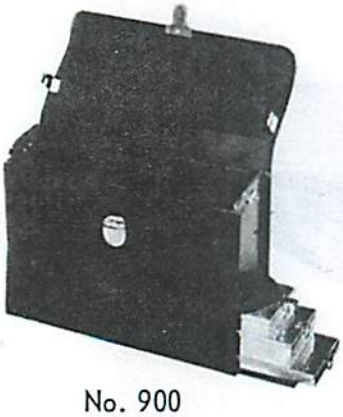


No. 136

No. 137



No. 138-T



No. 900

No. 902

No. 903

BASIC MECHANIC STARTER TOOL SET

The following is merely a suggested starter tool kit. There are no special adjusting tools in this list. They will be accumulated as you progress as a machine mechanic. Seldom does a mechanic own a complete set to perform each individual task – one could hardly carry it around. But later on you will probably want to advance to a larger and more complete set, such as kit No. 903.

No. 137	Tool Kit
No. T-141	Tool Roll
No. PB-10	Plastic Bottle
No. 3	Wiring Pliers
No. 17	Diagonal Cutting Pliers
No. 18	Needle Nose Pliers
No. 350	Open End Wrench Set 1/8'' through 1/4''
No. 26	Underwood Motion Stop Wrench
No. 28	Underwood Escapement Trip Wrench
No. 42	Bender
No. 48	Bristol Driver Kit
No. 64	Segment File
No. 67	Pillar File
No. 91	Spring Hook Set
No. 93	Segment Pick
No. 104-7	Tweezers
No. 1014	Spring Clip Push & Pull
No. 76	Hammer
No. 46	Smitty Allen Wrench Set
No. AVS-175	Oiler 5 1/4''
No. 81-8	Screw Driver
No. 83-6	Screw Driver
No. 216-4	Screw Driver
No. 47-S	Underwood Spline Wrench
No. B2N	Brush
No. B14	Brush

SETTING UP A SHOP

If you are setting up a shop or work space for yourself, there are a few important points to keep in mind. No matter where its location or how limited the space, your shop should be a smooth, efficient work area. You should give it some thought and devise a plan that would (1) Be neat (2) Follow a logical machine processing flow (3) Have the proper equipment.

As to the first point, a neat, uncluttered shop is a great aid to efficiency. "A place for everything, and everything in its place." Plan it that way!

Secondly, plan your step-by-step processing procedure. That is, arrange your tools and equipment to follow a machine's journey through your shop, from a table for inspections and estimates all the way through to the final step before the machine leaves your shop.

Thirdly, estimate your present financial condition, and also your future expectations, when purchasing your shop equipment. Get first things first, then plan ahead for additional equipment as needed.

The model service shop should consist of four rooms instead of the more popular one room – two larger rooms for service and storage, and two smaller ones for cleaning and painting.

Of course, the larger your shop, the more efficient your shop can be. But even the smallest work area can be efficient if well planned.

1. The cleaning area should be separate from the repair department so that any noise or dirt does not get back to the repair department.

2. Try to keep a separate area for spray painting. Lacquer paint produces a fine mist which can settle on other equipment.

3. Adequate ventilation should be provided, especially for the spray booth. Overall ventilation is a good idea.

4. Try to have an outside entrance to the service department so that incoming machines can be handled and deliveries can be made without having to go through the front store.

5. Provide yourself with an adequate work bench. Good work is seldom done on a crowded, cluttered table. If possible, plan a separate bench for first inspections and record keeping. Keep complete up-to-date records of your machines and transactions in an orderly fashion.

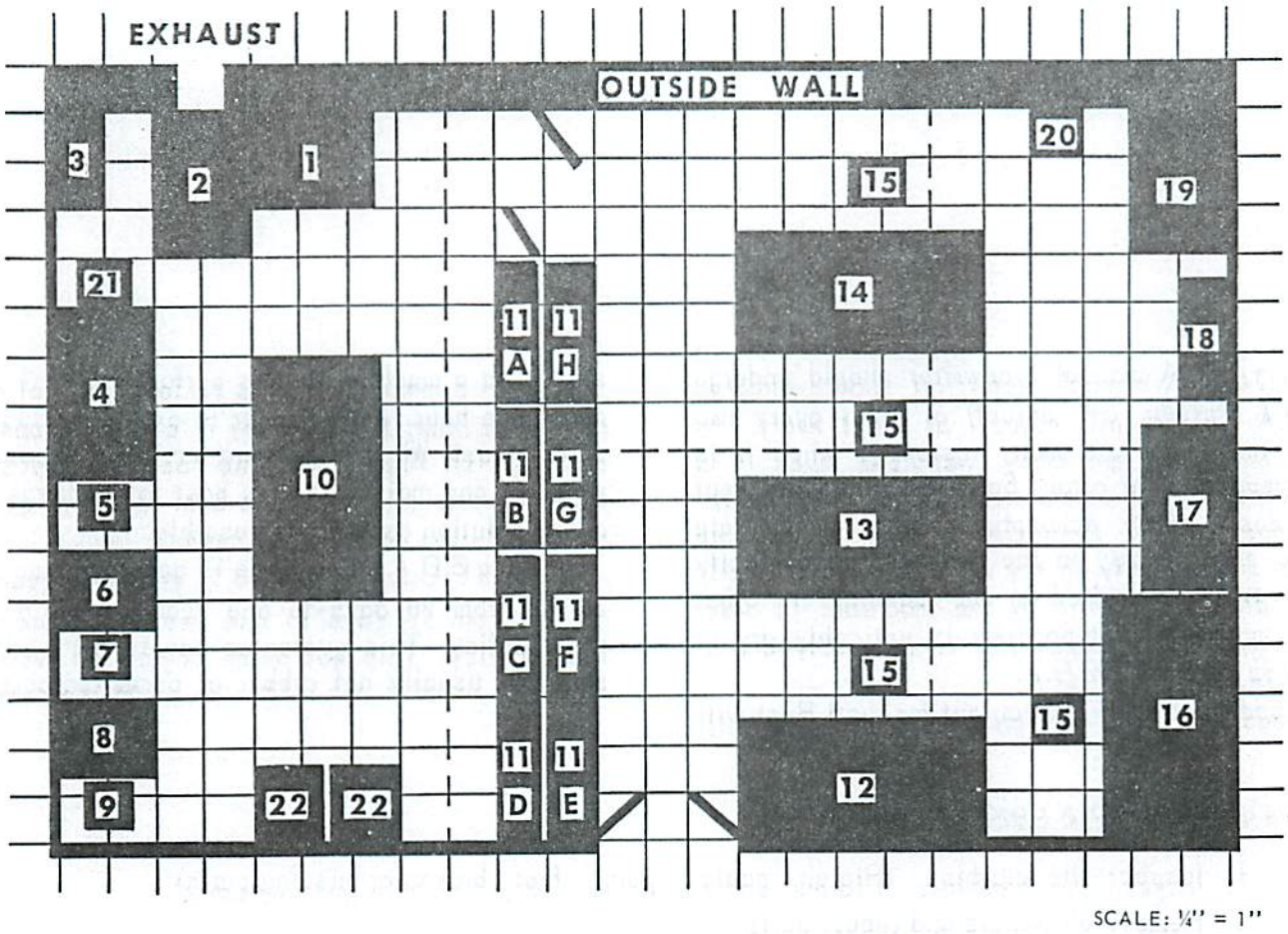
6. Plan a parts cabinet that will be large enough to accommodate parts of all makes of machines. Much valuable time is lost in a shop when parts are hard to find. Also have a system for ordering parts – a "want list" to go by. Keep this system going to keep your parts stock up-to-date.

7. You will need all the storage you can get, and you should try to have more than enough shelves. You will need storage for machines waiting for parts, junk machines used for parts, machines waiting on approval to be repaired, stock machines for repair loans, machines to be repaired, and machines that have been repaired.

8. Remember to keep and store shipping boxes or cartons. You will always need them.

9. Put a cover or plastic bag on machines that will not be returned immediately, because some machines will sit on the shelf for two to three weeks and become dirty.

SHOP LAYOUT AND EQUIPMENT



SCALE: ¼" = 1"

1. Oven – Baking and Drying
2. Spray booth – painting, dusting, Spray wash, etc. (Exhaust air outside)
3. Compressor
4. Clean-O-Matic
5. Left drain shelf
6. Rinse Tank
7. Rinse Tank Drain Shelf
8. Rinse Tank
9. Rinse Tank Drain Shelf
10. Work Table 60" x 30"
11. Steel Shelving

A. Machines to be washed
B. Machines to be painted
C. Machines finished – waiting to dry or cure
D. Machines for salvage
E. Machines to be delivered and pick-up
F. Machines for rental
G. Machines to be worked
H. Machines held for various reasons

11.F-G-H Upper shelves can be used for storage of supplies used in Service Department

11.A-B-C Upper shelves can be used for storage of supplies used in Cleaning Department

12- 13- 14- 16 Work Benches

12. Work bench or table to be used for estimating and to keep all catalogs and records pertaining to the Service Department, repair card, stock card, customer follow-up, cost records, etc.

15. Chairs
17. Parts cabinet. (Blueprint style)
18. Platen rack (wood rack, build as high as necessary) Compartments approximately 12" x 12"
19. Auxiliary table to hold large or seldom used tools and equipment
20. Grinder
21. Right drain shelf
22. Sink

NOTE: Not shown are small cabinets on each work table or bench to hold small parts, screws, washers, clips and springs. Lamps, tool holders, racks, etc.

CLEAN, OIL, ADJUST

DEFINITION A manual typewriter should undergo a C.O.A. (clean, oil, adjust) at least every two years, and there are many instances when it is recommended more often. Some machines are kept in a dusty, dirty atmosphere; some accumulate erasure dust quickly in the segment; occasionally a soft drink is spilled in the machine. In other words, any time a typewriter is noticably dry or dirty it is time for a C.O.A.

An additional tip – watch out for rust! Rust will set up on a machine that is perfectly dry of oil in about one hour. A typewriter is extremely susceptable to rust. When a machine has been exposed to water or any moisture, it is best to submerge it in an oil solution as soon as possible.

After a C.O.A., a machine is generally guaranteed for from 90 days to one year – according to local policy. This guarantee covers all workmanship but usually not rubber or parts replacement.

TEN STEPS TO A COMPLETE C.O.A.

1. Inspect the machine. (Platen, scales, paint, feet, broken or missing parts)
2. Remove all panels and rubber parts.
3. Pick the segment. (Tool No. 93)
4. Blow out. (Air pressure about 45 to 60 pounds)
5. Wash the machine. Use Lix No. 12 or other high grade cleaning solutions. Clean type, move the carriage left to right, margins, work type bar up and down. Agitate in this solution for about 20 to 30 minutes depending upon how dirty the machine is. Drain for about five minutes.
6. While machine is washing, use this time to clean cover plates, refinish scales, and clean rubber parts. Refer to Platen Section for the care of the platen and feed rolls.
7. Rinse the machine with hot water or mineral spirits. Be sure to rinse all the solution off completely.
8. Blow off excess rinse solution with air. Air dry with air pressure.
9. Place in oil solution for five minutes. (Mineral spirits and oil) This solution is very important. The mixture should not be TOO oily – just enough to leave a fine coat of oil on all parts. About 10 parts spirits to one of oil is a good point to start.
10. Drain and air dry.

Now you are ready to reassembly the machine and check all the adjustments. Do not replace the panels until you have gone through an adjustment check list.

REFINISHING

Typewriter refinishing can successfully be done in all shops today. Use Ames self-spray paints and lacquers. These come in pressure cans and in colors that match almost every typewriter on the market. You really do not need big paint booths or special equipment if you operate on a small scale, but you will probably find that after you have tried refinishing and found what it can do for your business, you will want to get the proper equipment.

SMOOTH FINISH – Typewriters with a smooth finish and plastic cases can be refinished if you use proper care and procedure. The cleaning and preparing of the surface is very important. Sand down all nicks and scratches with fine sandpaper or emery cloth. Feather these down to the point where you can feel no rough edges. Use a soft cloth with lacquer thinner to remove all oil, grease, or dirt from the surface. Try not to touch the area with your fingers, because the oil from your hands can be transferred to the metal. Follow the directions on the spray can, and shake the can a full four or five minutes to insure that the paint is completely mixed to give you a good paint job. Do not spray this lacquer paint near other machines, because the mist will surely settle on them. It is most important not to try to cover the machine with ONE coat of paint. Take your time!

Hold the spray can about 12 to 18 inches away from the machine, and spray a fine mist all over it. This is a fog or base coat. Allow this to set about five minutes. This base coat will help the next coat to stick and not run. Now spray a cover coat evenly all over the machine. This is the finish coat. Inspect it carefully for light places or runs. The machine can now be baked in a 175° oven or under infrared light – or it may not be heated at all. Some plastics will not tolerate heat and will warp. Lacquer paint will dry quickly, but still let the typewriter set for a few hours before handling it.

WRINKLE FINISH – To wrinkle paint a machine, prepare your surface with the same care you took with the smooth finish job. You must remember to use a wrinkle paint, because plain lacquer paint will not wrinkle when placed in heat as will the specially prepared wrinkle paint. Preheat the oven or heat lamp to about 175 degree heat.

There are three steps to follow in applying the paint. FIRST – apply a light mist coat for a base coat and allow this to set for five minutes. SECOND – apply a thorough cover coat and let this stand for five minutes. THIRD – and most important for wrinkle finishes – apply your gloss coat. Spray the machine until a completely glossy surface is achieved over the entire machine. Be very sure to check all curves and edges of the metal. Catch the light reflection on the sprayed area to see if it looks completely wet and shiny. If so, you are ready to heat the machine.

In wrinkle painting, the wrinkle comes from the inside, not the outside. If heat is applied directly to the outside, the surface will scorch and turn a darker color. You must have a good, even heat all over. The thickness of the material will determine how long it will take to wrinkle. A thin panel will take only five minutes. But the frame of a KMG Royal will take about 25 minutes; if it is going to wrinkle, it will in this length of time. Handle the machine very carefully when moving it in or out of the oven. Let it dry overnight to allow the paint to harden. TOUCH-UP WRINKLE PAINTING – Lightly spray the area that is scratched or marred, then touch the wet paint with a small sponge to achieve the wrinkle.

REFINISHING SCALES

Refinishing the scales on a typewriter could bring about a new and very satisfied customer for you. A typist uses these scales all day long. This is her highway to go by – the guide by which her work is set up. If she has difficulty reading her scale, and you refinish it for her, she feels you have done her a great favor. Also, by refinishing the scales, you will improve your used machines. They will look better, thus sell for more profit.

When checking the scales, remember that you have several to inspect. There will be the paper bail, the front carriage scale, the paper table scale, the touch control scale, and the line finder scale.

If a scale still has a good coat of paint, you can brighten the numbers with an engraver's lacquer stick. This comes in four different colors – red, white, black, and yellow. Rub the scale with the lacquer until there is sufficient lacquer in the indented numbers. Then wipe off the excess with a soft cloth. Do not touch the numbers with your fingers until they have thoroughly dried at least 24 hours.

If the scale needs repainting, first remove all of the old paint. Lacquer thinner is good for this. You might have to buff the numbers to make sure you have removed ALL of the paint from them since they are indented. Now spray the scale with a very, very light coat of lacquer. If the coat is too thick, the paint will fill up the indented numbers. After the paint has thoroughly dried, rub the numbers with the desired color of lacquer stick and wipe off the excess with a soft cloth. Let them dry without touching for 24 hours.

APPLYING DECALCOMANIA TRANSFERS

(VARNISH)

1. Apply a very thin coat of "Amesco" transfer cement to the face of the transfer.

2. It is important to allow the transfer to stand until the cement becomes "set", or until you can scarcely pick it up by touching with your finger. This may take as much as 30 minutes, depending upon room temperature and air currents which will vary the drying time. If the cement becomes too thick, thin with turpentine. If transfers are applied before the cement is properly "set", or if the cement is too thick, "setting" or shrinking takes place after the paper has been removed, causing the transfer to shrink or wrinkle.

3. Place the transfer on the surface and roll with a rubber roller so that it is firmly pressed against the surface, and all air bubbles are removed.

4. If on a SINGLE PAPER, wet the back of the paper with a sponge and water and roll again, wetting and rolling alternately until the paper is thoroughly saturated with the water. In cool temperature use lukewarm water.

If on DUPLEX OR DOUBLE PAPER, before applying water, the heavy paper should be pealed off, leaving the thin paper on the surface. After removing the heavy backing paper, roll the thin paper again and apply water, the same as for the single paper.

5. Lift or slide off the wet paper and wash the face of the transfer, first with a soft sponge and water, then with a soft cloth saturated lightly with turpentine or benzine, to remove the gum deposit from the face of the transfer and the surplus cement from around the design. If the gum remaining after the paper is removed is not washed off, it will dry and cause the transfer to crack. Go over lightly with a soft, dry cloth to dry the transfer. Allow to stand until thoroughly dry.

Decalcomania transfers are designed to use on smooth, hard finishes, but they may be successfully used on wrinkle finishes by pressing the design firmly on the surface with a soft cloth or sponge when the paper is wet to make the design conform to the uneven surface of the finish.

RIBBON SPOOLS

ROYAL

REMINGTON

UNDERWOOD (O. S.)
HERMES ADLER OLYMPIA

UNDERWOOD
(with flange)

SMITH-CORONA
(Below Serial No. 5,500,000)

SMITH-CORONA
(Above Serial No. 5,500,000)

RIBBONS

There are many different ribbon spools on today's typewriters, but the basic use of these spools is the same. See illustrations of the eight different spools that are used on the manual typewriters presented in this book. Most of the ribbons on current machines reverse by means of a tripping mechanism from an empty spool. This is the reason various manufacturers use different spools on their machines.

The most commonly used manual typewriter ribbon is the cotton ribbon. The cotton ribbon may be found in different grades – the grades being determined by the thread count, or the number of threads per inch. Common thread counts are the following: 254, 270, 290, 300, 312, 320. In general, the lower count fabrics, the coarser, are used for billing; the medium, for general commercial work; and the high thread count for work requiring very fine, sharp copy. The standard length of a cotton ribbon is 12 yards. Some manufacturers make a fine count cotton ribbon 16 yards long.

Silk ribbons, although more costly, are preferred for (1) Clean, sharp impressions, (2) Longer fabric life, (3) Cleaner type that will not clog up as easily. The silk threads are thinner than cotton for equivalent strength. More yardage can be wound on a spool. On the same spool that holds 12 yards of cotton ribbon, 18 yards of silk ribbon can be wound, thus the silk can give as much or more wear as the cotton.

Ribbons are inked in degrees ranging from very light to extra heavy, according to the requirements of the job and the preferences of the customer. Examples are extra light, light, medium light, medium, medium heavy, and extra heavy. Take care, when installing a new ribbon, to replace the old ribbon with one of the same inking. The customer will notice the difference right away.

Black is the most common solid colored ribbon, although ribbons come in other colors. The two-colored ribbon is usually black and red, but others are manufactured using black and blue, purple, green, or brown. When installing a two-colored ribbon, place the black at the top always. This is the way the bichrome section of a typewriter is made, and it works properly this way.

Nylon ribbons come in three general grades depending upon usage. The very thin is used for exceptionally fine write and in specialized machines such as the IBM Selectric. Nylon is becoming more widely used, because it gives better print qualifies than the cotton, and costs less than the silk, and gives longer wear. It is a good ribbon for all-around use.

A good way to check a ribbon to determine if it is worn and should be replaced is to pull a small portion of the ribbon between your thumb and index finger and observe the amount of ink that rubs off on your fingers. If very little ink clings to your fingers, the ribbon is dry and should be replaced. Remember, a ribbon can dry out without ever being used, so do not trust a visual examination. It may look new and unused but in reality be dry and useless.

PLATENS AND FEED ROLLS

PLATENS

A platen is the rubber roll in a typewriter that the type face hits in making the impression. The platen is often called the heart of the typewriter. It is one of its most important parts. The condition of the platen will indicate the condition of the machine as a whole. Consider the relationship of tires to an automobile. If the auto has good tires then you would assume the over-all condition of the auto is good. The same indication is true of a typewriter and its platen.

The platen plays a vital part in producing good typing on any typewriter. A worn or pitten platen, or an age hardened or improper type platen, can readily ruin the appearance and legibility of the typewritten line. A good platen gives even, clean, legible originals and good carbon copies as well as giving maximum wear and paper grip. A good platen results in less noise, less ribbon wear, less embossing (depression of the paper on the underside by the type head). It can lessen sluggish type action and excessive wear of the type heads. The machine will age slower, and, with a good platen, simply look better. However, it is a fact that a platen can look pretty good and yet have hardened and lost efficiency.

Many businessmen and typists do not realize the importance of purchasing a new platen. They do not attribute many of their typewriter's faults to a worn platen. The wise serviceman will point out these facts to his customers, bringing out items of interest. Not only should all the above points be brought out, but also you might mention that a new platen eases "typist's cramp". This ailment results from the jarring when the type strikes a hard platen. The customer will appreciate the over-all savings of his time and his money.

An additional fact worth the serviceman's attention is the fact that alignment can be and is controlled through careful selection of the proper hardness and resilience of a platen. A machine that has perfect alignment will have every character strike the platen exactly parallel – from top to bottom of each letter, or from side to side. This is assuming that all contributing factors to perfect alignment have been carefully checked and adjusted; such as, the ring and cylinder, on feet motion, a platen free of taper and concentric. Many times the type on used machines is out of alignment, and this, coupled with a hard, pitted platen, result in work that is both poor appearing and of poor quality. Nothing is more discouraging and less profitable than spending hours of tedious work on alignment when actually the platen does not lend itself to easy alignment.

Now, two important qualities of a platen have been mentioned – its hardness and its resilience. These two add up to what the serviceman calls "life" in a platen. If a platen has no more "life", then it should be discarded. Lacking scientific instruments, a simple test to determine the life left in a platen is to press a pencil point into a point at the far end of the platen. Is there still life in it, or is it inpenetrable and dead?

Never sand down a platen – you are doing the customer a disservice by sanding. Any platen that has a surface that is bad enough to sand needs replacing.

TIPS FOR ORDERING PLATENS FOR RECOVERING

Various grades of typewriter platens have been developed for specific purposes. You may analyze the needs of your customers and install the proper one. Six codes designate the hardness or density of platens. These codes are based on the number of carbon copies expected in general. This is only estimated, as factors such as paper weight, intensity of carbon paper, and the make of machine make a great difference in the number of copies produced.

PLATENS AND FEED ROLLS

CODE A 1-6 COPIES

Most widely used. Suitable for Portables or when only limited carbon copies are required in offices • Designed for best all-around service • Reduces Ribbon wear – Noise – Paper Slippage • Exceptions: New Model Machines or Weight of Paper and Carbon Paper used may require Code M for 5 or 6 copies.

CODE M 4 - 8 COPIES

Standard Grade for certain machines whose action requires a harder grade than Code A, such as: • IBM – Underwood Rhythm Shift – Smith-Corona – 6A and Up – Royal MC – Smith Corona 400 • Also used for constant requirements of 4-8 copies • Can be used for fewer copies but noise and ribbon wear will not be as good as Code A on same machine.

CODE E 8 - 12 COPIES

Commonly called "Hard". • A Standard platen on Noiseless Machines – for Specialized jobs on other machines requiring 8-12 copies continuously • Hardness affects ribbons and type faces – particularly an old, hard platen. Balanced Resiliency and Hardness in a new platen help offset this.

CODE S MORE THAN 12 COPIES

Called Brick Hard – used only when more than 12 copies are required • Also used for typing on extremely heavy paper or thin cardboard.

STENCIL-RITE

Correct Hardness for cutting stencils – offset masters – fluid masters • Special Compounding Resists oils of stencils which cause rubber to swell • Excellent for general office work requiring up to 6 copies • Stencil-Rite Feed Rolls should be used with Stencil-Rite platens for proper paper feed and protection against feed roll swelling.

When sending in Platens for recovering –

In general, all platens sent in for recovery should be checked for the following items.

1. Remove all platen knobs (especially Clary). Knobs break easily in shipment.
2. Make sure that no screws are left in the platen ends.
3. Remove all springs, (an example of this is on the Corona portables).
4. Remove all platen shafts from Underwood old style and old style KMM, KMG model Royals.
5. Remove variable tongue washers on all Royal platens.
6. Remove page gauge on L. C. Smith models 88, 62, 6A and 7A.
7. Do not remove ends from wooden cores.
8. *All Adler* power rolls must have the shaft with them.

Ames can grind most platens with parts either removed or left on but on certain types of platens, Ames can get much more concentric grinding job if you will do the following:

1. Leave the variable line space assembly on all Underwood 150. This is especially important in the late style Underwood 150 where the end of the platen is of a Delrin (or plastic) construction.
2. Leave the variables on Remington Models L, R, B, No. 2, 17 and Super-riters.
3. Do not knock out the shaft on the General adder.
4. Remove variables from Underwood rhythm shift and deluxe. This is a left-handed screw so make sure that you turn clock-wise to remove the variable.

PLATENS AND FEED ROLLS

CUSHION AND NON-CUSHION PLATENS

These terms refer to the thickness of the rubber found on the platen. The charge for recovering is based on both the length of the rubber on the platen, and whether it is cushion or non-cushion.

Generally, Cushion platens have a rubber wall thickness over 3/16" and non-cushion platens have a wall thickness under 3/16".

Platen cores are designed by the individual manufacturers to take either cushion or non-cushion rubber, but are not interchangeable. In other words, you cannot put cushion rubber on a non-cushion core, and vice-versa.

SINGLE WALL AND DOUBLE WALL CUSHION PLATENS

Single Wall cushion platens are, just as the term indicates, a solid wall of rubber of the same hardness and resilience. Double Wall cushions have a harder outer jacket with a softer inner layer and the theory is that the combination of the two layers gives a hardness and resilience reading in between them

SINGLE WALL
Entire wall of a high grade virgin rubber.

DOUBLE WALL
Outer wall of high grade virgin rubber. Inner cushion a soft rubber compound.

Actual lab tests of all kinds fail to uncover any noticeable difference in the performance of either type, except in certain specialized applications, so the difference appears to be only a matter of opinion. Most dealers prefer single wall which is Ames' standard compound, but for those who wish it, Ames have double wall too.

CORE REPAIR

Ames make many minor repairs to both wooden and metal cores without charge to you before recovering. Ames do charge when making a major core repair. This is done when the platen cannot be recovered properly unless the end is changed, or if the defect will cause improper operation in the machine. Although platens are inspected for defects at the time of receiving, it is possible to miss one that may have been causing trouble in the machine.

LOAN CORE SERVICE

As an additional free service to you Ames will loan you platens or feed rolls you may need for special jobs. Sometimes your customer cannot spare his machine long enough for you to send the platen in, and you do not have an exchange platen in stock. Instead of passing up the platen sale, just drop Ames a line and state which platen you want "on loan".

The platen will be sent to you billed as a "complete" platen which covers both recovering and the core charge. When you return the used core, Ames will issue credit to you for the core charge. The recovering charge is all you pay, and is the same as if you were able to send in the core for recovering as usual. Core loans are limited to those which are in stock. Ames can obtain new cores of all kinds for your stock, but cannot buy those and loan them to you. There is a very wide variety of cores on hand, and Ames should be able to supply you with most common models and lengths.

PLATENS AND FEED ROLLS

PAPER FEED ROLLS

Paper feeding is accomplished by exerting pressure on the line space lever, which causes the line space mechanism to advance the paper a predetermined distance (one, two, or three spaces). As the platen rotates, the paper is carried with it because of the intimate contact between the paper, platen and feed rolls. The feed rolls exert the necessary pressure to maintain the friction to advance the paper or carbon pack in short, quick spurts. Feed rolls must be of the proper hardness to insure the greatest contact with the paper without creasing it. Any condition which results in more pressure on one or more of the feed rolls may cause treeing of carbons, smudged carbon copies, or a tendency of the paper to feed at an angle.

Feed rolls age like the platen. They lose their ability to grip the paper. So they should be changed with the platen.

When sending in Feed Rolls for recovering –

Removable type individual feed rolls should be taken off the shaft before sending them in.

To prevent accidental loss of individual feed rolls, place them in a small box or bag with the platens. The container should be strong enough to prevent breaking in shipment when hitting sharp platen ratchets or shafts. Small feed rolls are easily thrown away in packing paper.

CARE OF THE PLATEN AND THE FEED ROLLS

Time, sunlight, and oil as well as the ozone in the atmosphere, are the natural enemies of rubber. In areas such as the West Coast the concentration of ozone is high. These enemies of rubber cause platens to become slick and feed rolls to swell. In addition, the size coating on most papers tends to fill the microscopic crevices in the platen surface. This results in glazing and lost friction. Ink and stencil oils as well as wax from carbon contribute to the glazing of the platen, and the oils attack the feed rolls and cause them to swell unless they are made of a special oil resistant material. You will invariably find that a church or a school has given a typewriter constant use cutting stencils, resulting in the platen becoming "out of round" and the feed rolls swollen. Washing the platen and feed rolls occasionally with alcohol, lacquer thinner, or any of the special platen cleaners, removes the size, oils, and wax, and helps improve the surface. However, no chemical can restore a new rubber life to a platen that has aged.

THE PITCH OF A TYPEWRITER

The pitch of a typewriter refers to the number of characters or spaces per inch of type. It does not necessarily mean the size of the type, although a certain pitch machine should have a compatable size type. The most commonly used pitch styles are the 10 and the 12; that is, 10 spaces per inch or 12 spaces per inch. This is an accurately measured inch. The two most common type sizes or styles are the pica (10 pitch) and the elite (12 pitch).

There are numerous pitches – 6, 8, 9 1/3, 14, 16, or 20. A typewriter with a 6 pitch will naturally have larger type than one with a 16 pitch.

When replacing worn or broken parts, knowledge of the pitch is very important. For instance, if an escapement rack tooth is broken or damaged, you must replace the rack with a rack of the proper pitch.

Some of the other parts of a typewriter which must correspond to the proper pitch are as follows: 1. Starwheel, 2. Escapement pinion gear, 3. Escapement rack, 4. Starwheel check pawl (on a Royal a "1" stamped on it means 12 pitch; a "2" means 10 pitch), 5. Margin rack, 6. Tab rack, 7. Back space pawl, 8. Paper pan scale, 9. Paper bail scale, 10. Front carriage scale, 11. Tab brake pinion, 12. Line finder scale.

A part is normally a 10 pitch part unless it is stamped in such a way as to indicate another pitch.

Always check the pitch with a ruler and be sure. Do not rely on your eyesight. Do not use a "big" or "little" reference when speaking of pitch. Refer to a typewriter as 10 pitch or 12 pitch, etc.

BINDS

DEFINITION – Binds cause about 75% of the trouble typewriter mechanics have when working with a machine. Their typewriter adjustments would be greatly simplified if binds could be eliminated. But, unfortunately, they doggedly occur and cause trouble. A bind is the result of two metal parts incorrectly rubbing together, causing friction. This bind may cause tightness or sluggishness of some parts.

CAUSES – Some binds are caused by dirt or grit and can be simply remedied by thoroughly washing the machine. Other binds can be caused by any number of reasons; a piece may be bent or formed out of place, an incorrect screw or spring may be present in the typewriter; too much oil or grease may be a cause. Check various points to make sure that they were cleaned and oiled thoroughly; such as, the ribbon vibrator, the segment shift, the key lever action on all the keys, carriage freedom, free margins, etc.

TRACING A BIND – If all this has been done and the bind still holds, you must "chase" or "trace" the bind, as we call it, to pinpoint the exact location. Never form (bend or twist) a lever or part merely to find out if that is the point of the bind. Also, never oil a part that might be dirty to get the bind out. Oil might help a clean part to operate more smoothly – but oiling a dirty part will only lead to trouble. It may give temporary help, but you can bet the bind will be back. Never be an "oil can mechanic"!

One of the best methods I have found to chase or trace a bind is to separate the problem. In other words, if you have a bind in the back space mechanism, try to locate the bind by moving the key up and down very slowly and watching the parts involved to see if they move freely. If you still do not locate the trouble, disconnect the linkage and check this out piece by piece until you do locate it. When you find it, deal with the bind in the necessary way.

HELPFUL HINTS – If a part has been formed, or bent, and you form it again, you will weaken this piece or probably break it. When you find a part that is bent, replace it with a new part if possible. If you do not have the proper part, remove the part from the machine where you can deal with it with less risk.

Sometimes you cannot see exactly where the bind is. Buffing or emerying a piece will remove a burr or nick and cure many binds.

Proper spring tension can be helpful in dealing with a bind. Never cut off a spring or put a stronger spring on a part to stop a bind. This will only cause a bind to occur in another place and increase your problem instead of curing the one that you started with.

Again, be careful in dealing with binds. This particular part of typewriter mechanics takes patience, practice, and much experience. You must respect binds. They are one of your worst enemies!

TYPE ALIGNING

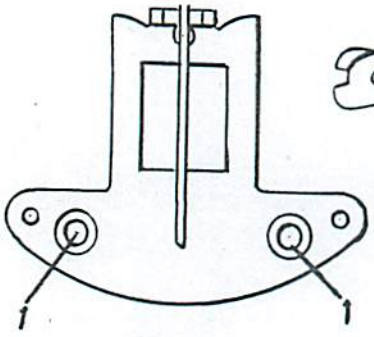


Figure A

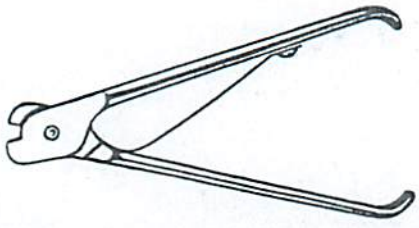


Figure B

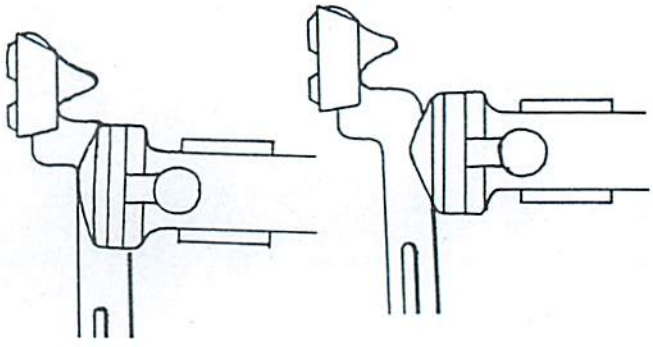


Figure C

Figure D

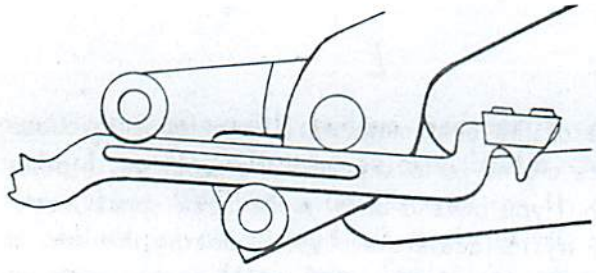


Figure E

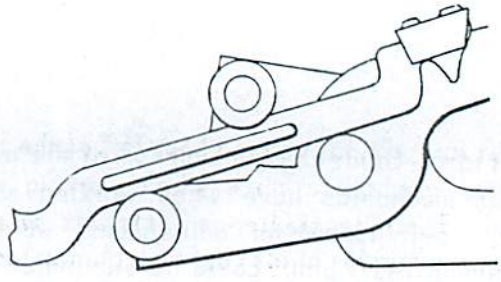


Figure F

Type aligning is a difficult art! It requires patience and experience. Each mechanic usually develops his own system or technique. The following is merely a few suggestions.

Type aligning is the procedure which results in all the letters, both caps and small, striking on the same even line. (Called the "writing line"). Aligning also insures that all letters are standing erect and not tilting to one side or the other.

The Ring and Cylinder of each type bar must be checked first. If this is not correct, alignment will be off. (Study the Ring and Cylinder section). If a type bar is found to have incorrect Ring and Cylinder, it can be formed with the No. 5 Keylever Benders. To form the type head closer to the platen, place the No. 5 benders as shown in Figure "F". To form the type head farther from the platen, place the No. 5 benders as shown in Figure "E".

All type bars should enter the type guide without contacting either side of the guide. Check by *lifting* each type bar up slowly and noticing if the type bar enters the guide centrally. Most typewriter guides can be repositioned by loosening screws 1 in Figure "A" and tapping the guide to the left or right.

If an individual type bar sticks in the type guide, use the No. 2 three prong pliers, Figure "B", and form the type bar to the left or right as needed. Place two prongs of the pliers on one side of the type bar and the single prong on the other side. The type bar can then be formed in the direction of the force of the single prong.

Use the "N" or the "H" key as a guide letter and compare all the other keys to this key. Strike the "N" key alternately with all the other lettered keys across the keyboard. (NSNXNENDNCNR, etc.) You now have a comparison of the keys and their relative condition.

If any one of the letters is out of line by .003 to .005, its type head should be resoldered. (See type soldering section). If a letter is higher than the guide letter, use the No. 9 peening pliers and peen the type bar as shown in Figure "D". If a letter is lower than the guide letter, use the same peeners and peen the type bar as shown in Figure "C". Exercise care when using peeners. Practice with this tool on an old type bar before trying a good one.

TYPE SOLDERING

No. 49 UNIVERSAL TYPE SOLDERING GAUGE

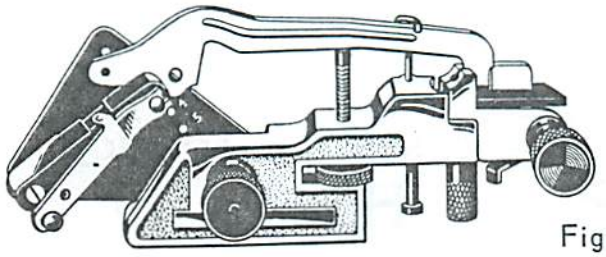


Figure A

No. 50 IDEAL TYPE SOLDERING GAUGE

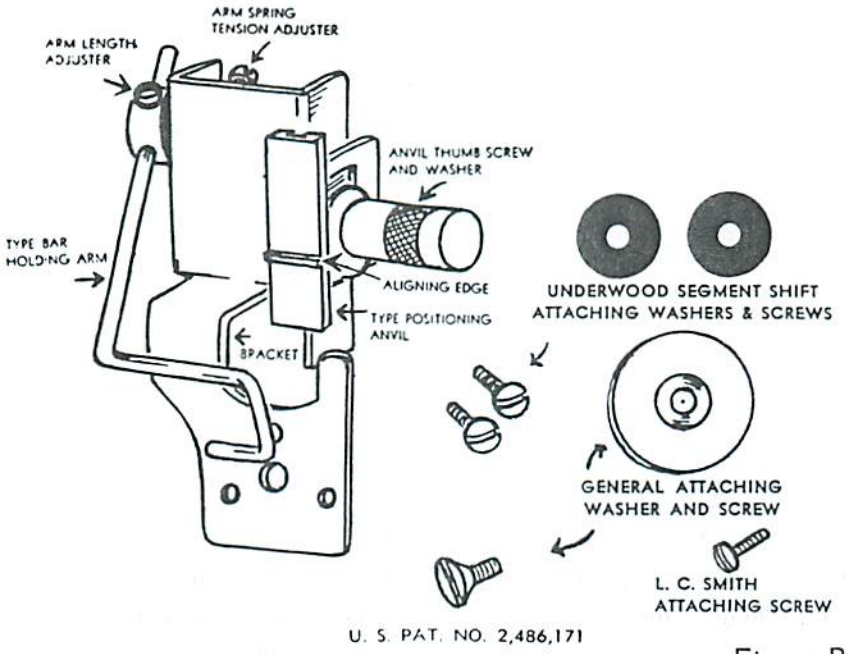

ARM SPRING TENSION ADJUSTER
ARM LENGTH ADJUSTER
ANVIL THUMB SCREW AND WASHER
TYPE BAR HOLDING ARM
ALIGNING EDGE
TYPE POSITIONING ANVIL
BRACKET
UNDERWOOD SEGMENT SHIFT ATTACHING WASHERS & SCREWS
GENERAL ATTACHING WASHER AND SCREW
L. C. SMITH ATTACHING SCREW
U. S. PAT. NO. 2,486,171

Figure B

If a type head becomes unsoldered, or if a letter is out of alignment by more than .005, the type head must be resoldered.

Several methods are used to resolder type. The two most commonly used are the "on" type and the "off" type methods. The "on" type method is resoldering the type head while the type bar is still in the machine. Use the No. 50 Ideal Soldering gauge, Figure "B".

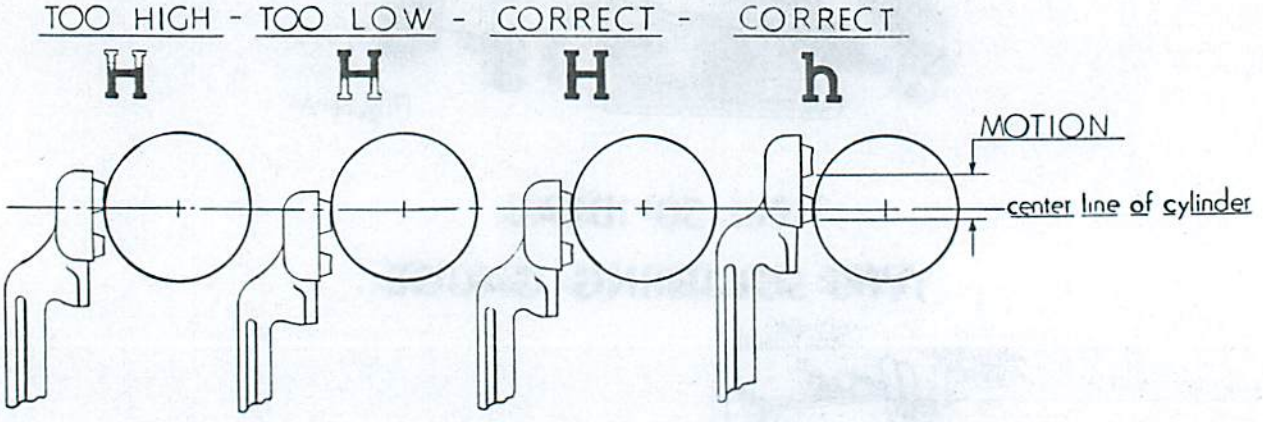
The "off" type method is resoldering the type head while the type bar is removed completely *from the machine*. Use the No. 49 Universal Soldering gauge, Figure "A". In either case, remember to check the type head's alignment while in the gauge.

With either method, the type head should be completely removed and cleaned thoroughly with a good cleaning solution. Then apply heat to remove all old solder.

To solder, reheat the type head and merely touch the solder to the opening in the head. The melted solder will run down into the back of the head. Let it cool and then remove the gauge.

Lastly, recheck the Ring and Cylinder and the Type Alignment.

ON FEET AND MOTION



The mechanic will refer to the following adjustment as "on feet and motion", but do not be misled. "On feet" is one adjustment, and "motion" is another.

"On feet" refers to putting the type "on its feet"; that is, having the top of a letter print with the same density darkness as the bottom of the letter. It can further be said that the type face is bisecting the platen. Simply, you are matching the curvature of the type face with the curvature of the platen.

NOTE: The "on feet" adjustment must be performed before the "motion" adjustment. In this book you will utilize both cap and small letters, as either is indicated.

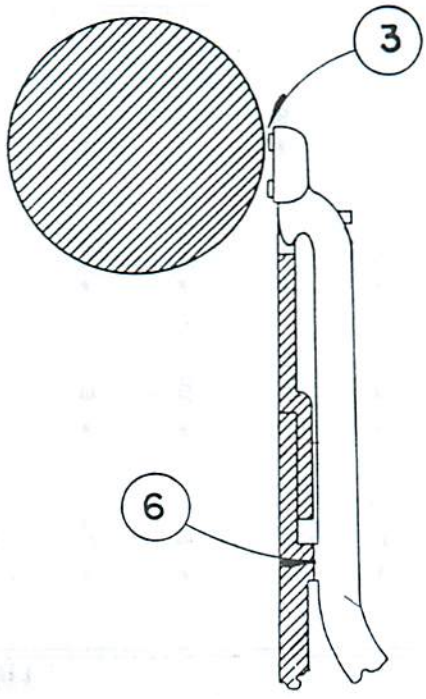
In checking the "on feet" adjustment, use the various "square-type" characters; such as, "H", "K", "N". "M", "L", "½", "/", etc. These particular ones help you compare the density of darkness at the top and the bottom of the letter. Always check for "on feet" adjustment all the way across from Left to Right. In addition you will learn if the platen is parallel with the segment.

NOTE: The Ring and Cylinder adjustment must be performed before the "on feet".

If capital letters have been used for "on feet" adjustment, the "motion" adjustment will line the small letters up with these caps. In other words, after making the "on feet" adjustment, you must adjust or position the small letters to "sit" on the identical line with the caps. This "motion" adjustment is relatively simple. It consists merely of limiting the movement of the segment at a point where both caps and small letters line up.

NOTE: Again, the Ring and Cylinder adjustment and the "on feet" adjustment must be completed before the "motion" adjustment can be made.

THE RING AND CYLINDER



To check a machine's ring and cylinder is to check the distance between the type head and the platen, or printing surface. To understand this, you must remember that the type head itself does not contact the platen (3). Rather, it is thrown into it. The "ring" (6) is that portion of the machine which limits this type bar when it is depressed.

CHECK AND ADJUST THE RING AND CYLINDER WHEN - -

1. A new platen has been installed.
2. The carriage has been removed or adjusted.
3. The bottom rail has been removed or adjusted.
4. The segment has been removed or adjusted.
5. "On feet" adjustment has been made.
6. A new type bar has been installed.
7. Type alignment has been completed.
8. Extra heavy paper will be used in the machine.
9. Multiple copies will be made.

CONDITIONS NECESSARY FOR A GOOD RING AND CYLINDER CHECK & ADJUSTMENT - -

1. Correct platen diameter.
2. A platen in good condition.
3. Carriage adjusted snugly.
4. Segment secure – no end play.
5. Segment ring smooth – no nicks.
6. Bichrome lever set in stencil position.

To check the ring and cylinder:

1. Bring a type bar up to the platen, 2. Insert two sheets of paper between type head and platen as at (3), 3. Press the type bar at (6) with finger 4. *Pull paper out.* There should be a slight "drag" on the paper.

Do this with more than one type bar, because type heads will vary. Choose type bars from the left side, from the center, and from the right side of the segment. The larger letters are better to check with (H, K, L, ¼, Z, X).

Move the carriage from left to right and check at the left, center, and right positions of the carriage.

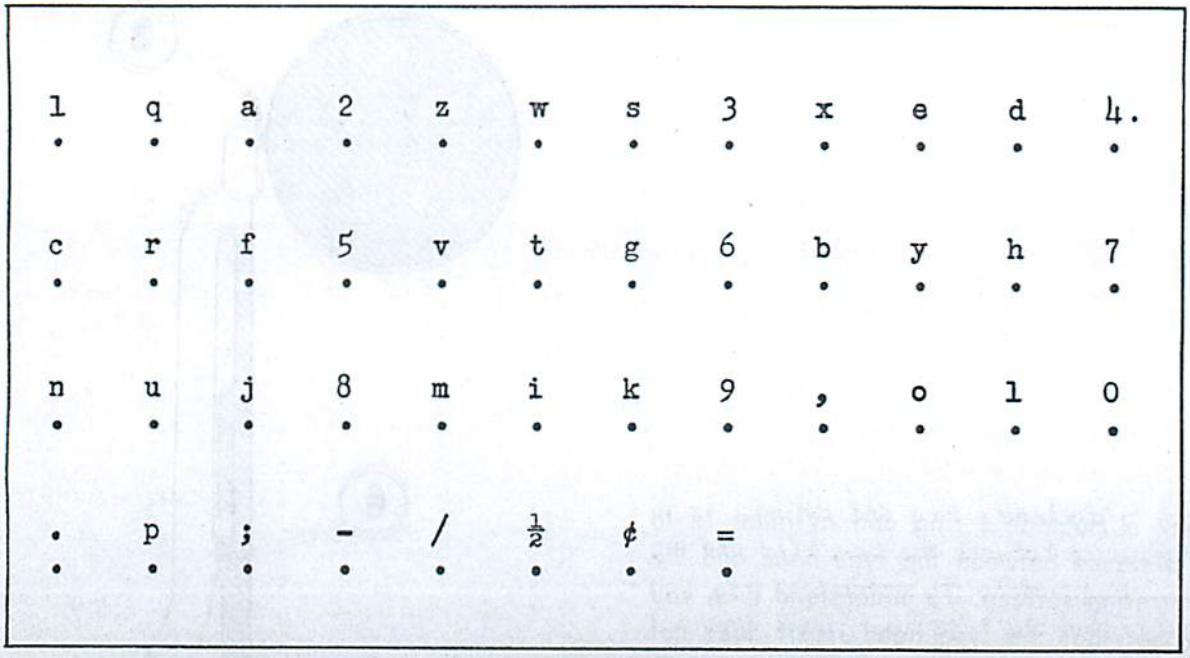
RESULT: Choosing type bars from the left to the right side of the segment and also moving the carriage from the left to the right side, will help you get the best ring and cylinder check that you can.

The adjustment of the ring and cylinder will vary with different typewriters. As a general rule, move the carriage or platen forward or to the rear in order to get a proper ring and cylinder. In some extreme cases, move or tilt the segment for this adjustment. Remember: When moving the carriage or the platen, move both sides equally!

When a machine's ring and cylinder has been adjusted, therefore altered, other adjustments are disturbed; such as, the trip, the bichrome, the tabulators, the margins. You must recheck all of these.

The ring and cylinder is important! The adjustment requires great care! Check and recheck the ring and cylinder continually!

TYPE BARS AND LINKS



LINK BOARD

This Board is constructed of a piece of 2 x 4 wood about 6 inches long. Use a No. 27 Drill and make 44 holes about 3/4" deep.

The TYPE BARS are the levers on a typewriter that are thrown up to contact the platen and make the impression on the paper. There are 44 type bars on the later model machines. Older models have 42 – some 43. The type bars are pivoted on a wire called the fulcrum wire. They are connected to the bell crank by a type bar Link. These links will vary on different machines. The Royal type bar links are not interchangeable – the Underwood links are interchangeable.

When removing all type bars and type bar links, it is a good idea to use a Link Board. (See illustration) This board keeps the links separated and in order. It is especially useful with the Royal typewriter and similar models.

The type bars are numbered 1 through 44 starting with the left hand side. They are not interchangeable; that is, the "H" bar and the "A" bar cannot be switched. The center point of the type bars is between the "Y" and the "H" keys.

To Remove a Single Type Bar you need a follow-up wire of the same diameter as the fulcrum wire to prevent the other type bars from falling out. This follow-up wire is placed in the slot nearest the type bar to be removed. Push the follow-up wire into the slot and force the fulcrum wire out a short length at a time. When you get the follow-up wire at the point of the type bar removal, back it out slightly. Remove the type bar.

To Remove All of the Type Bars feed the follow-up wire in until the fulcrum wire comes out the other side. Pull the fulcrum wire out so that you can remove one type bar at a time.

Now is the time to Place Links in the Link Board. Make a note as to how the links are connected. Some links hook left – some right. In each section of this book you will find a notation as to how particular links are connected.

If a link breaks, a temporary emergency measure is to use a paper clip (small piece) as the link. Never leave this in the machine permanently. Replace it with the proper link when you obtain it.

When REPLACING THE TYPE BARS, connect the links first – then place the type bar in the proper slot. Work the fulcrum wire through the hole in the type bar. Never force this wire in as this may put a burr on the type bar, and its action will become sluggish.

After all the type bars are installed, check to see that all are free. Hold the space bar down, and depress the keys one at a time. They should fall back into place with a snappy action.

ESCAPEMENT

The escapement section is truly the brain of the typewriter. It is the part that makes the typewriter go. The escapement is the portion of the machine that enables it to move and type – space by space. It is composed primarily of a Universal Bar, Starwheel, Pinion, and Rocker Assembly.

The Universal Bar is usually called the U Bar. It is the part that the key levers or type bars contact to activate the rocker assembly. The U bar must be parallel so that all of the key levers or type bars will pull or push the U bar the exact same distance. The U bar is the first part you must check when checking or adjusting the escapement section.

The Starwheel and Pinion are usually referred to as one unit. The starwheel and pinion must be the same pitch. (See General Information for pitch.) The number of teeth on the starwheel and pinion will determine what pitch a particular typewriter is. The starwheel and pinion must be free on the shaft. On some machines the starwheel and pinion are one piece. The carriage rack rides in the pinion. The proper mesh of these two is most important.

The Rocker Assembly is made up of a loose dog and a rigid dog – and on some machines, the master trip adjustment screw. It is the action of these two dogs working with or in contact with the starwheel that enables the carriage to move to the left in a space by space movement. The rocker is pivoted on two rocker screws. The rocker must be centered between the rocker brackets.

There are six major rocker assembly adjustments.

1. 6:00 O'clock adjustment – The proper location of the rocker between the rocker brackets.
2. Front Limit adjustment – The position of the rocker in a neutral position.
3. Back Limit adjustment – Limits the backward movement of the rocker.
4. Left to Right Distance between the Loose Dog and the Rigid Dog.
5. Front to Rear Distance between the Loose Dog and the Rigid Dog.
6. Master Trip Adjustment Screw.

All of these adjustments must be correct according to factory specifications.

All of these adjustments will vary on different machines and will be covered in the escapement section of each individual machine, approximately eight paragraphs per machine.

The adjustments that must be checked in the escapement section of a typewriter are the following.

1. U Bar – Free of binds, parallel, straight and true.
2. Starwheel – Free of binds, proper pitch.
3. Pinion – Proper pitch, meshes with rack properly.
4. Rocker Assembly
   - A. 6:00 O'clock position.
   - B. Front Limit.
   - C. Back Limit.
   - D. Loose Dog and Rigid Dog distances.
   - E. Master Trip Adjustment Screw.

Not one of the above parts can be damaged – all must be in good condition.

If these adjustments are not correct, the typewriter will "skip" or "pile". To "skip" means there is an unwanted space between letters; for example, typew riter. To "pile" means that one letter falls on top of another; for example typewriter.

BICHROME

The section of a typewriter that positions the ribbon so that it may be contacted by a type head is referred to as the bichrome mechanism.

Bichrome means two positions – usually, black and red. The stencil position is the neutral position, and it is ordinarily found in the center. Some typewriters have four positions; for instance, Remington. These four are red, black, center, and stencil. With the center position, the center of the ribbon can be utilized when one is typing on an all-black ribbon.

Step-by step operations will be followed in this book when dealing with bichrome adjustments on individual machines. These steps must be followed in a sequence, i.e., power source, rest position, throw, and limits.

Binds must be continually checked in the bichrome section. The ribbon vibrator is usually the point that attracts them, because an operator could have installed a ribbon incorrectly or could have bent the vibrator. This vibrator must be free.

INSPECTION CHECK SHEET

The following is a condensed check list to be used as a reminder. A copy should be placed on the wall in front of your work bench, and another should be placed in your tool box. It is simply a reminder and is not intended for instructional purposes. You may want to add a few ideas of your own. Even an experienced mechanic will overlook some of these points, so this check sheet is good insurance.

1. Brush Machine out
2. Clean type
3. Clean Platen and Feed Rolls
4. Clean Outside Cases
5. Install New Ribbon
6. Carriage Adjustments
7. Drawband Tension
8. Rack Adjustment
9. Ring and Cylinder
10. Platen Knobs
11. Feed Roll Tension
12. Variable
13. Line Space Lever
14. Scale Alignment
15. Line Finder
16. Escapement Trip
17. Space Bar
18. Bichrome R.B.S.
19. Ribbon Feed R – L
20. Ribbon Reverse R – L
21. On Feet
22. Motion
23. Shift Locks
24. Type Alignment
25. Margins L – R
26. Bell
27. Line Lock
28. Margin Release
29. Tab Set – Clear
30. Tabulator – Brake
31. Back Spacer
32. Type Bars Free
33. Feet Clean
34. Keytops Tight
35. Overall Appearance

Always check with the operator to see if anything in particular is giving trouble, and *then repair* it. Try to improve the machine's appearance in order to assure the customer he's getting his money's worth.

TIPS

- Always use the proper size screwdriver for the screw head. Keep a good tip on the blade.
- Never turn a machine upside down to work on it. This will damage the carriage levers, etc.
- Never put excessive pressure on screws when tightening them. Just "snug tight" is sufficient.
- Always make sure screws are going in straight – never at an angle.
- Be very careful when forming a piece of metal. It might break or crack.
- Always use the proper size wrench to fit the nut. Never use pliers or parallels on nuts to tighten or loosen them.
- Never use oil rather than making the proper adjustment.
- Take your time to think out a problem. Don't jump at your first conclusion. Nine out of ten times your first guess is wrong.
- 90% thought – 10% work!
- When all else fails, better read the instructions.
- Be prompt! Report to work on time. Call if you will be late.
- Keep a clean and orderly tool kit.
- You are a technician – not a grease monkey. Act like one.
- Reread "Customer Relations" in the General Information Section and follow the suggestions.

NOTES

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ROYAL INDEX

Illustrations provided through the courtesy of Royal Typewriter Company, Inc., A Division of Litton Industries.

Technical Material written by the author.

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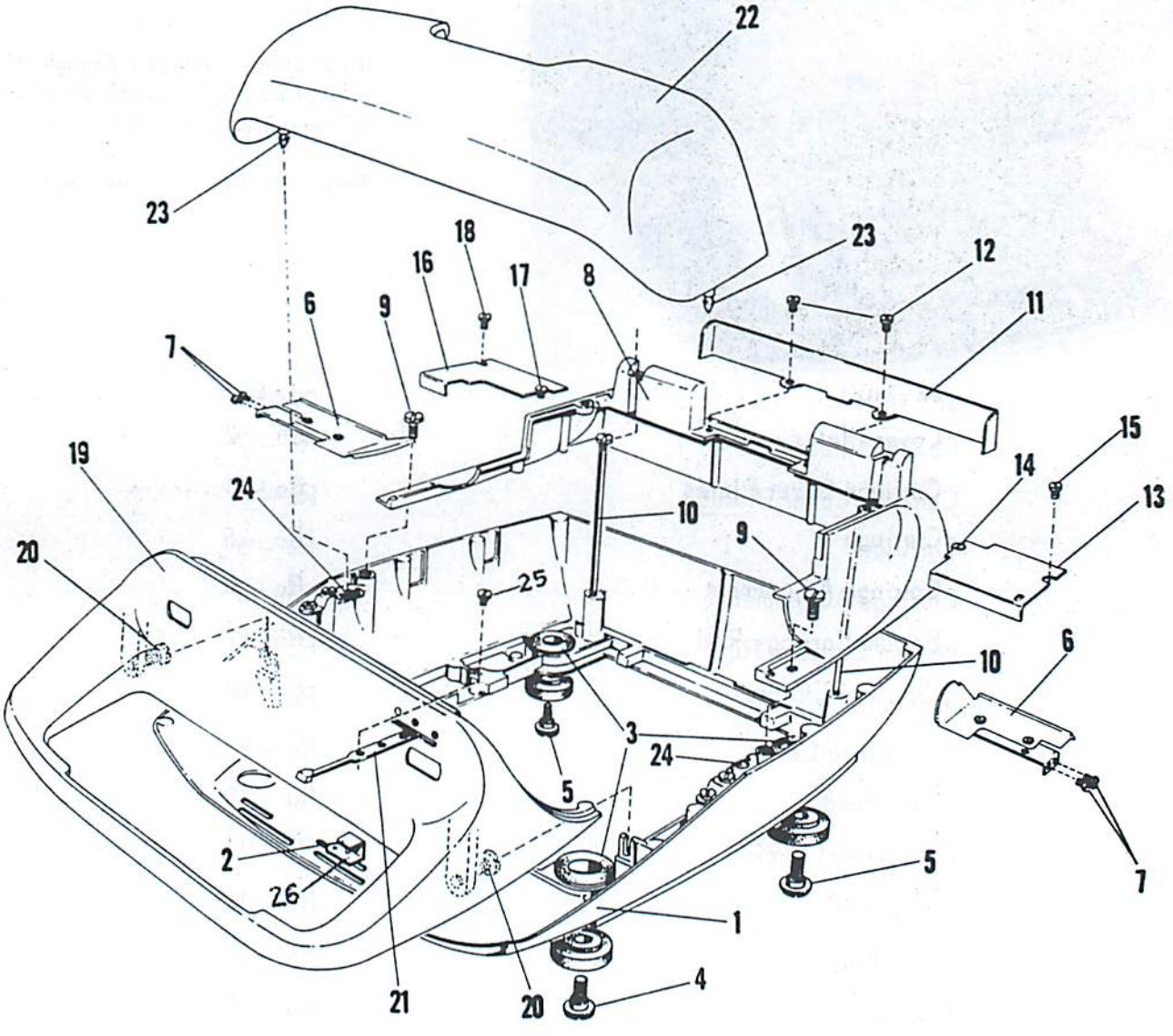
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REMOVAL

Move Carriage to left.
Lift up on Plate (22).

Remove Screw (25).
Remove Lever (21).
Loosen Screws (20). L & R (2)
Depress Tab Set and Tab Clear and hold in lightly.
Remove Plate (19).

Loosen Screw (14).
Remove Screw (15).
Remove Plate (13).

Loosen Screw (17).
Remove Screw (18).
Remove Plate (16).

Remove Screws (9) L & R. (2)
Loosen Screws (10) L & R. (2)
Remove Plate (8).

Remove Screws (7) L & R. (4)
Remove Plate (6).

Extend front feet over edge of desk.
Remove Screws (26). (2)
Remove Buffer (2).

Remove Feet Screws (4) L & R. (2)
Extend rear feet over edge of desk.
Remove Rear Feet Screws (5) L & R. (2)
Lift machine from Plate (1).

REPLACEMENT

Place Rubber Pads (3) with Beveled Side Down.
Place metal washers on top of Pads.
Place machine in Plate (1).
Extend rear feet over edge of desk.
Install Feet Screws (5) L & R. (2)
Extend front feet over edge of desk.
Install Feet Screws (4) L & R. (2)

Position Buffer (2) over Space Bar Bracket.
Install Screws (26). (2)

Position Plate (6).
Install Screws (7) L & R. (4)

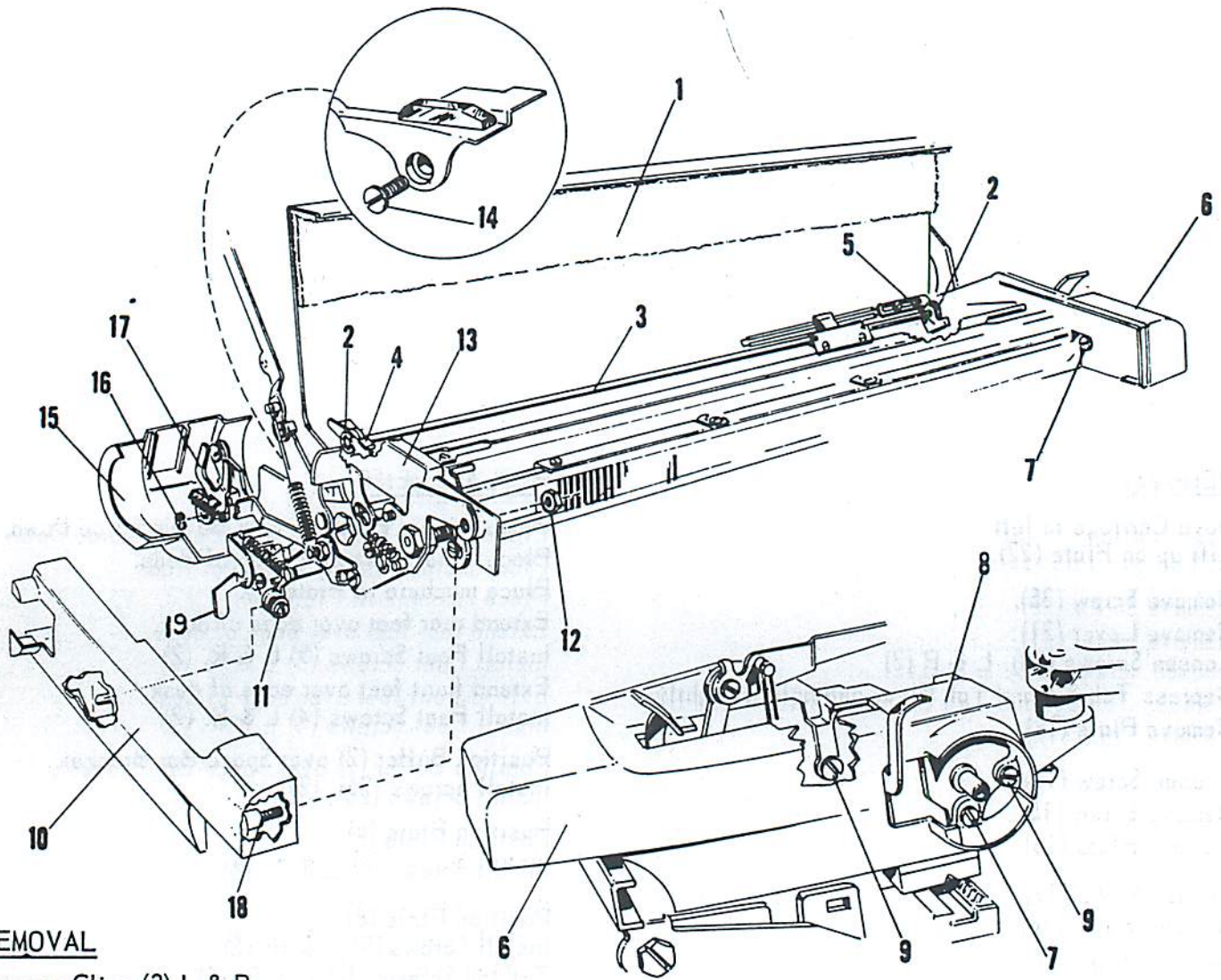
Position Plate (8).
Install Screws (9) L & R. (2)
Tighten Screws (10) L & R. (2)

Position Plate (16) into Slot at (14).
Install Screw (18).
Tighten Screw (17).

Position Plate (13) into Slot at (14).
Install Screw (15).
Tighten Screw (14).

Position Plate (19). Check Screws (20).
Tighten Screws (20) L & R. (2)

CARRIAGE COVER PLATES ROYAL



REMOVAL

Remove Clips (2) L & R.
Slide Rod (3) to right.
Lift Plate (1) and Rod (3) out to left.

Pull Lever (19) forward.
Lift Platen out.
Loosen Screw (11).
Remove Nut (12).
Remove Plate (10).

Remove Screw (14).
Remove Plate (13).

Remove Clip (16).
Slide Plate (15) and Yoke (17) off.

Loosen Left Platen Knob Screws.
Remove Left Platen Knob.

Remove Screws (7). (2)
Remove Plate (6).

Remove Screws (9). (2)
Remove Plate (8).

REPLACEMENT

Position Plate (8).
Install Screws (9). (2)

Position Plate (6).
Install Screws (7). (2)

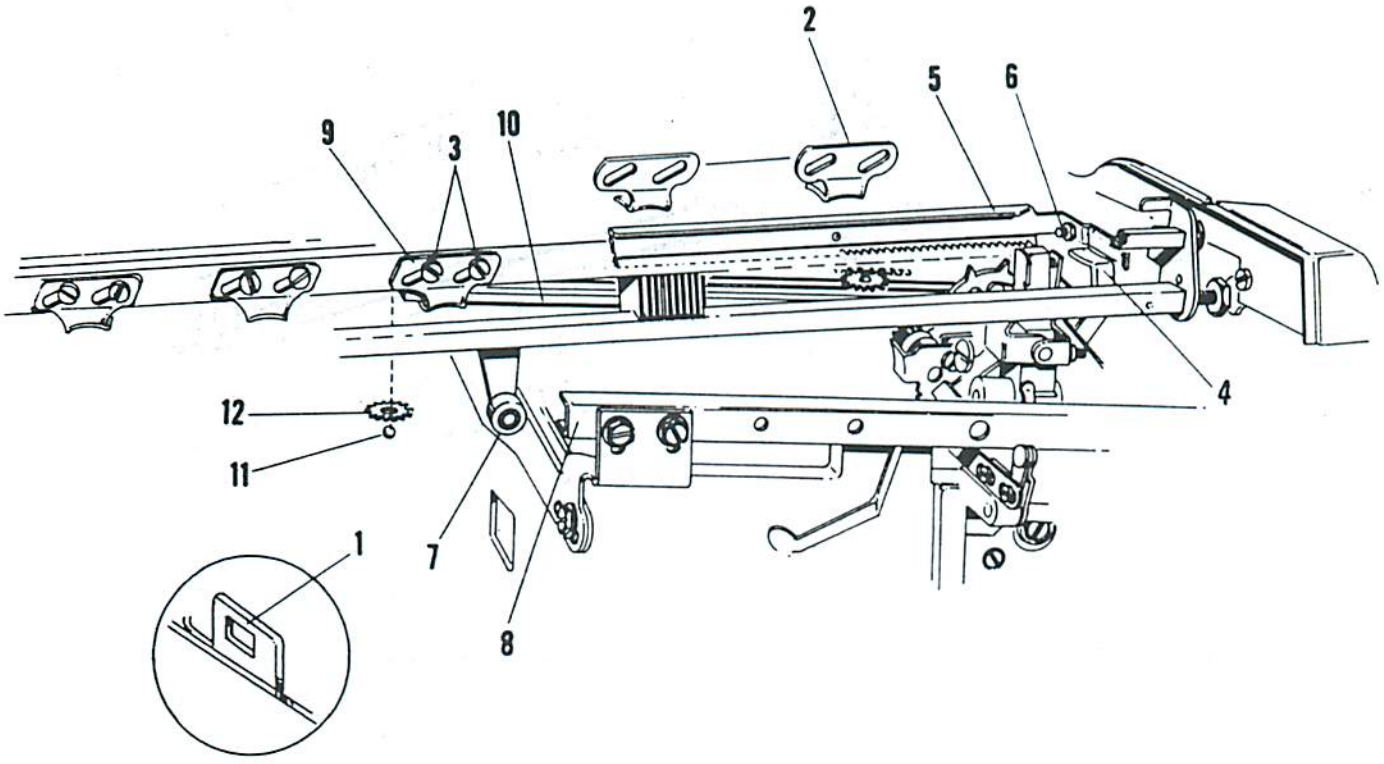
Install Left Platen Knob – not too tight.
Tighten Set Screws (2)

Position Plate (15) and Yoke (17) on Stud.
Install Clip (16).

Position Plate (13).
Install Screw (14).

Position Plate (10).
Install Nut (12).
Install Screw (11).
Clamp Platen in machine.

Fit Rod (3) into Opening (5).



REMOVAL

NOTE: FACE REAR OF MACHINE

Remove Drawband from Carriage Stud.
Place Drawband in Slot (1).
Move Carriage to extreme right.
Remove (2) outside Clamps (2).
Loosen Center Clamp Screws (3). (2)
Allow Clamp (9) to fall free.

Set Left Margin at center of Carriage.
Depress, and while holding down Margin Release Key, move Carriage to extreme left.
Lift right side of Carriage.
Guide Lever (4) through Slot (5).
Move Carriage to left to clear Roll (7).
Lift Carriage up and off.
Remove (2) Ball Bearings (11) and (2) Pinions (12).

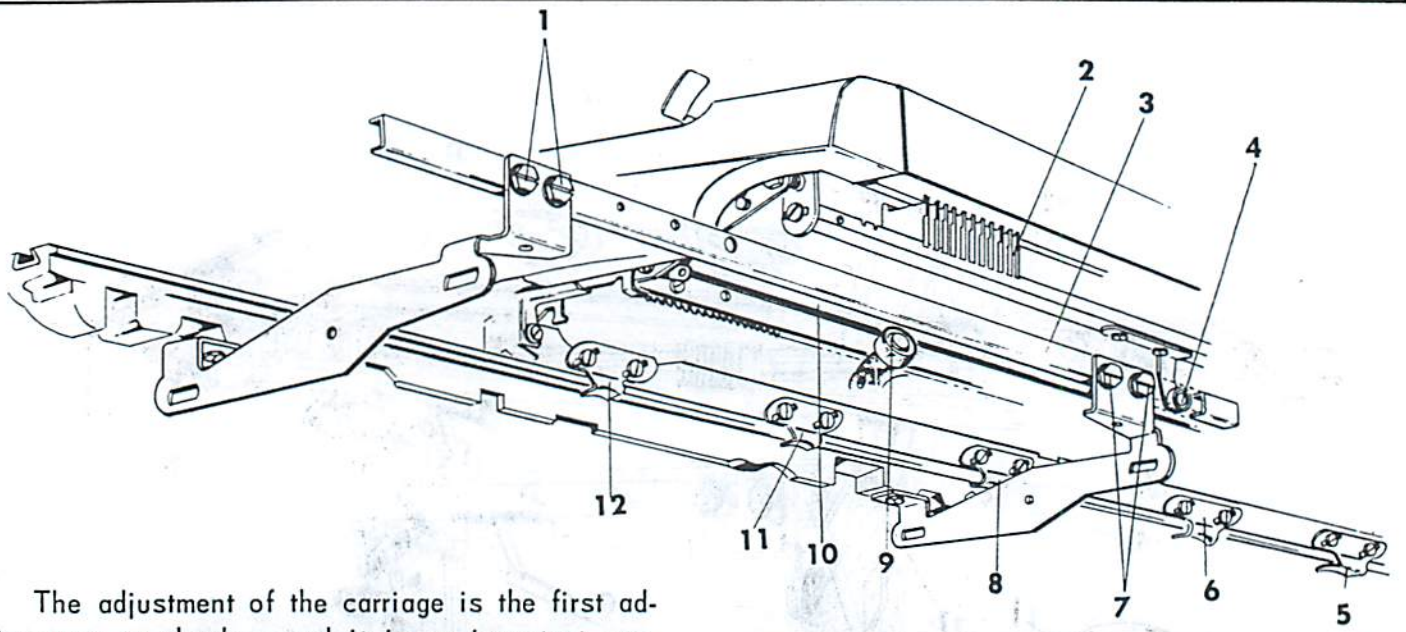
REPLACEMENT

NOTE: FACE REAR OF MACHINE

Place right end of Carriage at center of machine.
Place Roll (7) in Rail (8).
Guide Lever (4) through Slot (5) with finger.
Check Clamp (9) to be sure it is under bottom rail.

Place Ball Bearing (11) and Pinion (12) with beveled side down, about three teeth from end of bottom rail.
Move Carriage to the right.
Install Ball Bearing (11) and Pinion (12), beveled side down, about three teeth from end of bottom rail.
Install (2) outside Carriage Clamps (2).

CARRIAGE ADJUSTMENT ROYAL



The adjustment of the carriage is the first adjustment to check – and it is an important one. Disconnect the drawband before beginning.

The carriage must be free of binds; that is, the carriage must be moved from the extreme right to the extreme left with no drag or rough spots. Also, the carriage must fit snugly. There should be no excess play at the carriage end. When the carriage adjustment is completed, move the carriage to either extreme end and check for excess play or shaking. Check the rear roll (4). It should be tight on its pivot. This pivot may loosen and cause a loose carriage. Again, the carriage movement must be free!

After the carriage is positioned on the bottom rail, recheck the ball bearings and pinions to make sure they are still three teeth from the end of the bottom rail and that the beveled edge is down.

Adjust the two outside carriage clamps first, next adjust the next two inner clamps (toward the center), and lastly adjust the center clamp. You will find that if you obtain a good adjustment of the two outside clamps, the other clamps will be easier to adjust.

In adjusting the outside clamps, bring the clamp up snugly against the bottom rail. Move the carriage to a point where the clamp is positioned in the center of the bottom rail. (If you are working with the left clamp, move the carriage to the extreme right, and vice versa.) The carriage should now be tight. This is because the bottom rail has a .002 inch bow in it. Loosen screws (1) and (7), 2 each of them, slightly. Move the right end of the back support rail (3) UP slightly. Check to see if the carriage is freer by moving it left and right a short way. If it is still tight, go DOWN slightly with the right end of the back support rail. Check again to see if the carriage is freer. Position the right end of the back support rail so that the carriage, at that point, is as free as you can get it. Perform the same adjusting sequence with the clamp at your right, using the left end of the back support rail. After adjusting the two outside clamps, tighten the back support rail screws.

Adjust the next two inner clamps by bringing them up against the bottom rail and moving the carriage back and forth. Tap these clamps up or down as needed to get them as close as possible without binding.

Now adjust the center clamp in the same manner as you adjusted the last two clamps. This clamp must be adjusted snugly to insure that there is no end play in the carriage when the carriage is at either end. If this clamp is loose, the ball bearings and pinions will move out of place or even fall out of the machine.

If you have trouble perfecting the carriage adjustment, remove the back support rail and check to see if it is perfectly straight. This rail sometimes bends and causes a bind in the carriage. You might have to replace this rail with a new one. Check the teeth of the bottom rail and carriage rail – these teeth should be in perfect condition. They could be mashed and develop burrs. If so, use a fine file and dress them down.

Again, a good carriage adjustment is essential to a good typewriter.

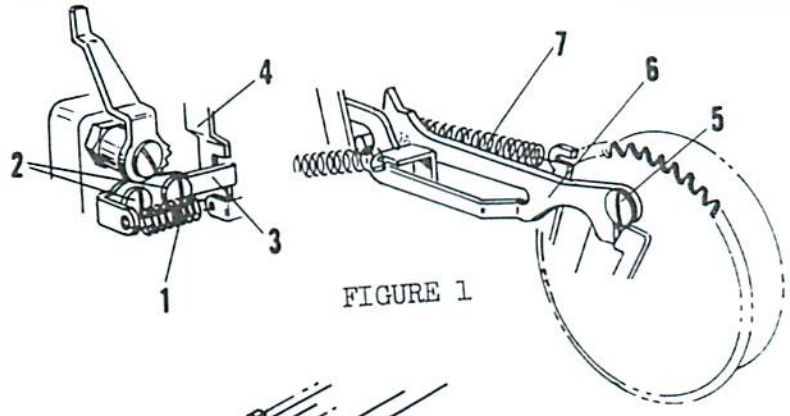


FIGURE 1

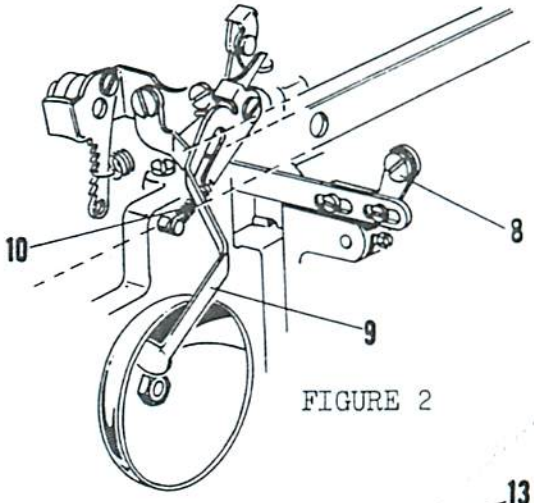


FIGURE 2

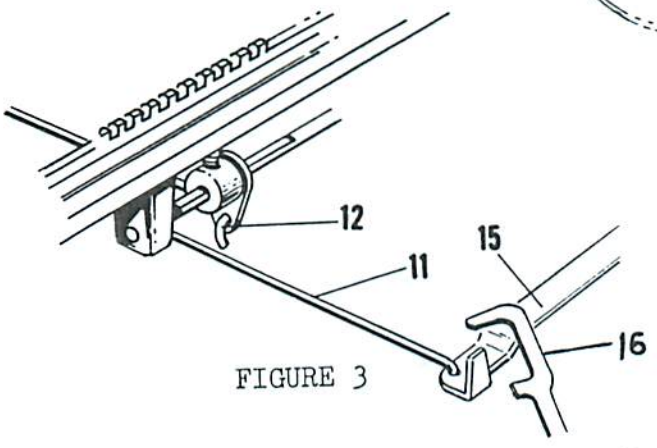
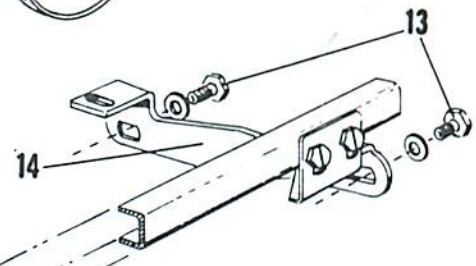


FIGURE 3



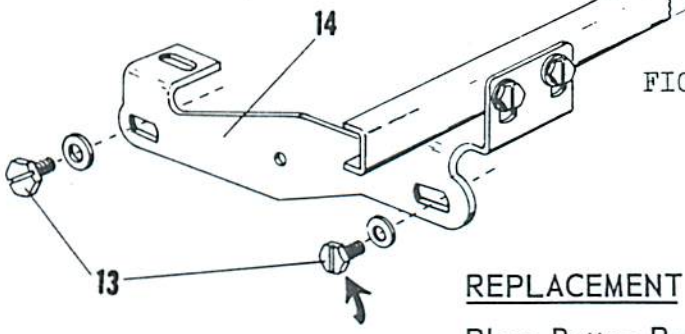


FIGURE 4

REMOVAL

Remove carriage.
Remove Screw (5).
Remove Back Space Pawl (6) with spring (7).
Disconnect Spring (10).
Remove Screw (8).
Disconnect Link (12).
Disconnect Link (11).
Remove Screw (1).
Loosen Screw (2).

Mark position of (14) on side frame with a sharp instrument. This is to keep Ring and Cylinder adjustment in tact.

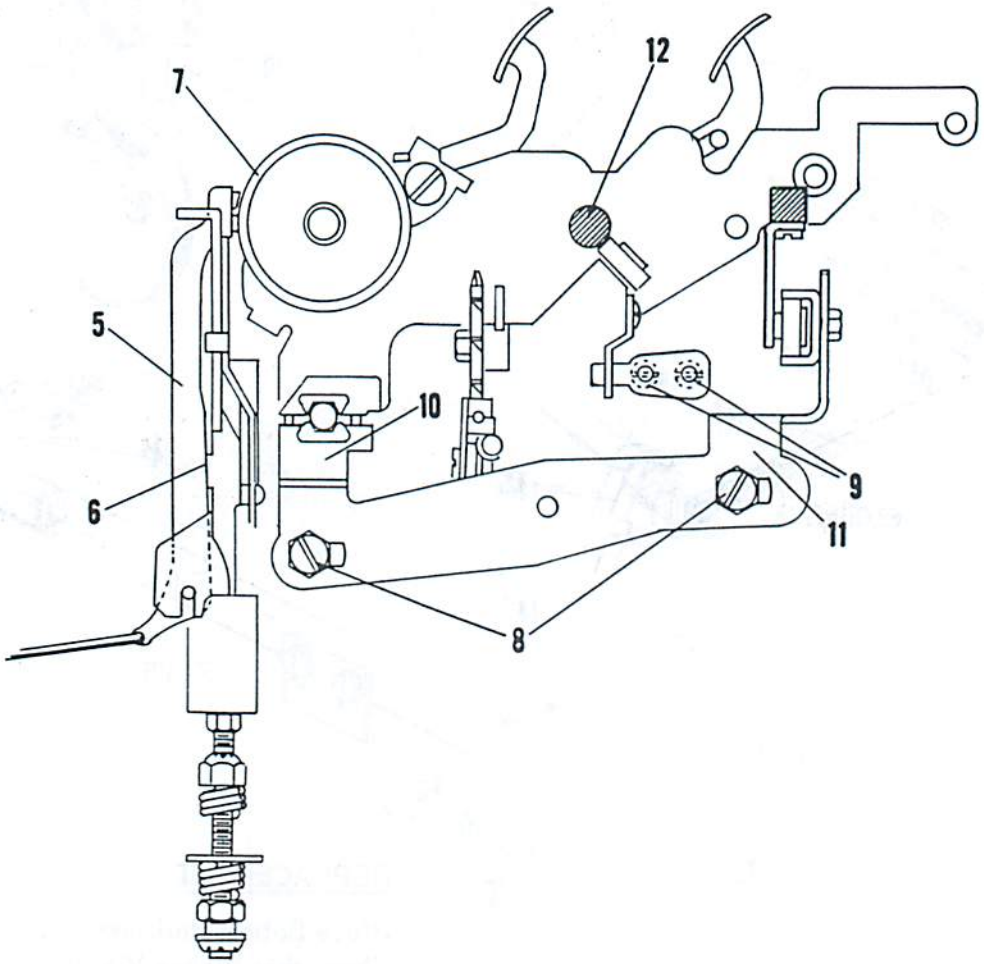
Remove (4) Binding Screws (13). NOTE: (3) large, (1) small.

Lift Bottom Rail from base. (Lift ribbon vibrator out with bottom rail) Check that Lever (15) clears U Bar Lock Lever (16).

REPLACEMENT

Place Bottom Rail into position.
Check that Ribbon Vibrator is in position.
Check that Lever (15) is under U Bar Lock (16).
Check that Arm (3) is in notch of Arm (14).
Check that Bottom Rail is settled flat on base of machine.

Install Screw (1).
Tighten Screw (2).
Connect Link (11).
Connect Link (12).
Install Screw (8).
Connect Spring (10).
Replace Pawl (6) and Spring (7).
Install Screw (5).
Position Rail (14) to the mark.
Install Screws (13). (Smaller one on right rear)
Tighten (3) larger screws first.
Tighten smaller screw.
Replace Carriage.



IMPORTANT: STUDY INFORMATION ON RING AND CYLINDER IN THE GENERAL INFORMATION SECTION FIRST FOR DEFINITIONS.

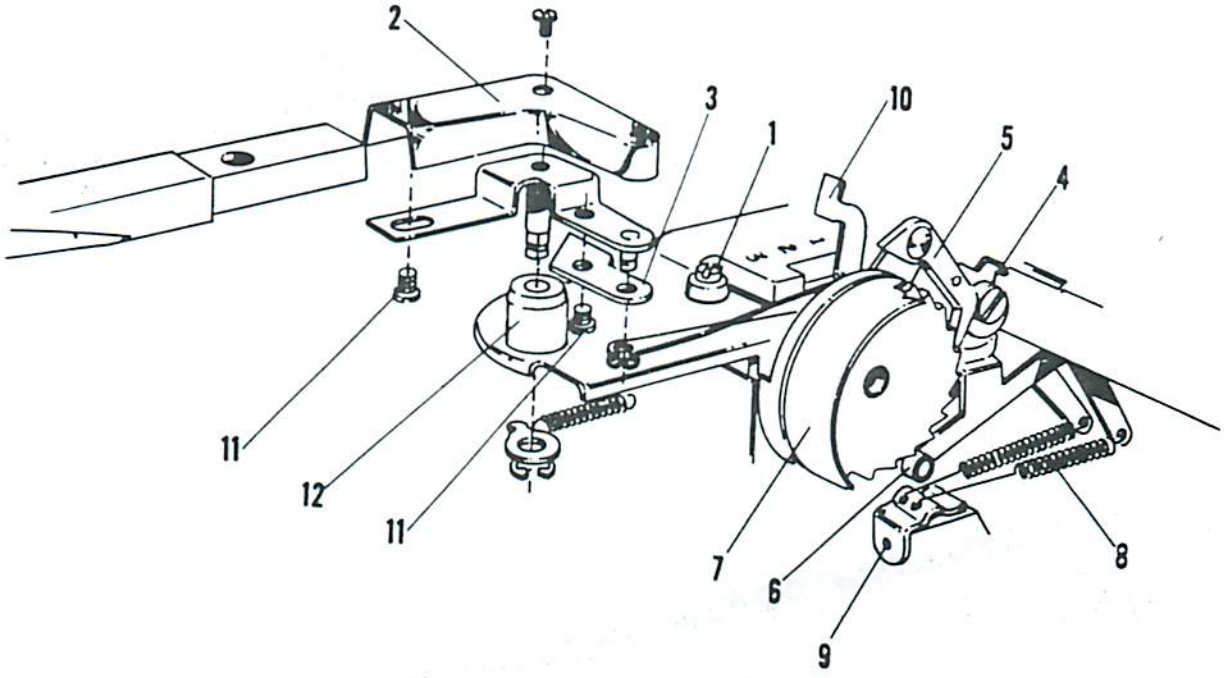
Before beginning the ring and cylinder adjustment:

Check the carriage adjustment.
Check the segment adjustment.
Check the platen adjustment.
Check the platen condition.
Check the condition of the ring.

To adjust – loosen, just "snug tight", the four screws (8). Move the bottom rail forward or rearward until there is a slight drag on two sheets of paper. Be sure you move the left side of the bottom rail the same amount as the right.

Tighten the three larger screws of the four screws (8) first and the right rear, smaller screw (8) last.

Recheck the trip, the bichrome, the margins, and the tabulator adjustments



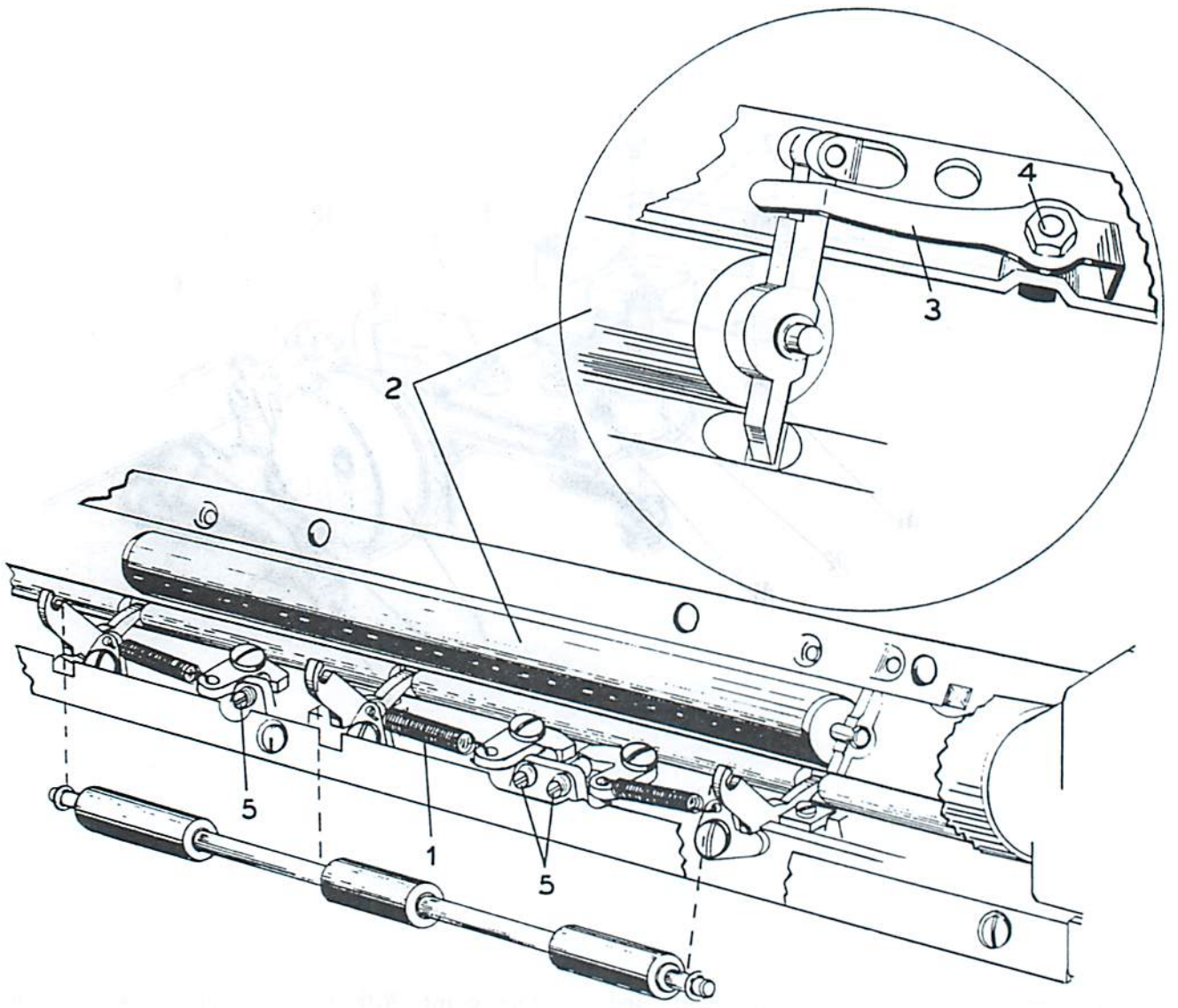
The line space lever is one of the most used and abused parts of a typewriter. It is sometimes thrown hard and quickly – other times lightly and easily – according to the mood of the typist. Make sure, therefore, that all adjustments are correct, tight, and free from binds.

1. Stud screw (1) is the limit for line space lever (2). This is adjusted with selector (10) set for 1 space. As you push the line space lever in slowly, the ratchet (7) should be turned one complete space. Stud screw (1) should contact lever (2) just as ratchet (7) has clicked into place. Adjust screw (1) for this.

2. Eccentric screw (4) is a check point to insure that the ratchet cannot be thrown over 1 space. It actually locks pawl (5) into the ratchet teeth at this point. With the line space lever pushed into contact with stop screw (1), adjust screw (4) so that it almost contacts pawl (5). There should be a small amount of clearance (.003) between pawl (5) and screw (4). NOTE: Keep high side of eccentric (4) down.

3. Roll (6) is the detent roll that holds ratchet (7) stationary. The tension of spring (8) can be increased or decreased by screwing (9) in or out. Ratchet (7) should produce a good click each time it rotates. Check the condition of roll (6), for it receives much wear.

After completing the adjustment for 1 space spacing, place selector (10) in the 2 space position and check that it is spacing twice. Make the *same* check in the (3) space position.

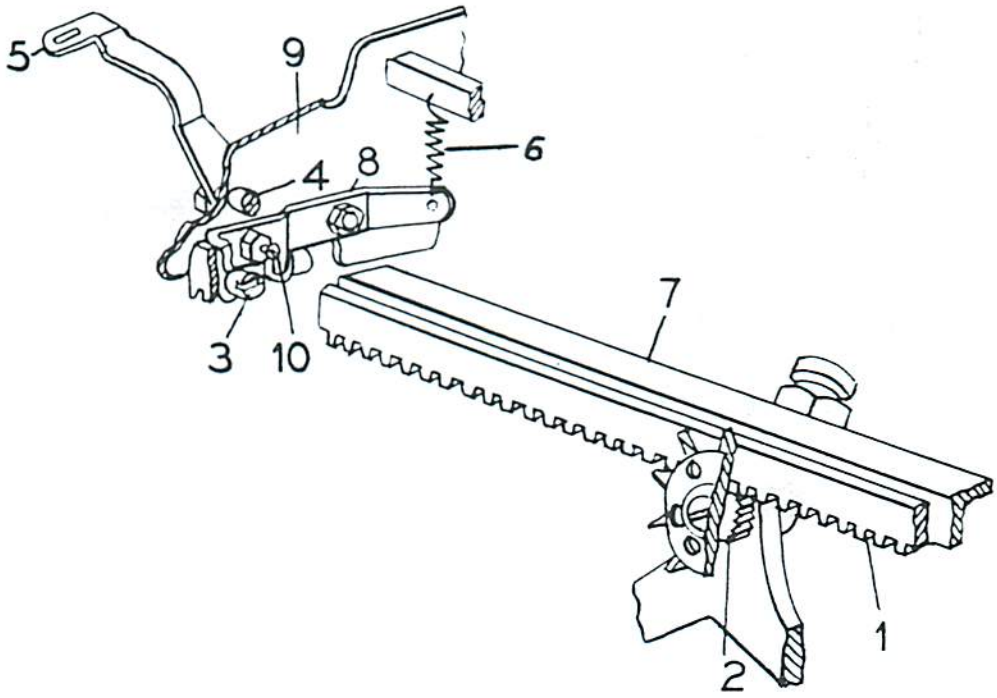


Proper paper feed depends almost entirely upon the condition of the platen and the feed rolls. If these are in good condition, your paper feed problems are about solved. Review the platen and feed roll pages of the General Information Section. This information will help you determine if a new platen or new feed rolls are necessary.

CAUTION: Never assume that by merely adjusting the tension of the feed rolls you will always eliminate the paper feed problem.

To adjust the front feed rolls, turn adjusting screws in to increase the tension and out to decrease the tension. The front center feed roller has a heavier spring. This is to equalize the pressure on the front shaft. Check that the tension is even on all three front rolls. There should be slightly more pressure on the front rolls than on the rear roll.

To adjust the rear feed roll, turn nut (4) in to increase the tension and out to decrease the tension. The tension should be the same at both ends. Never place excessive tension on the rear roll as this will cause the paper to wrinkle.



The escapement rack is the part of the carriage that controls the movement of the carriage. It is either in mesh with the pinion (2) or out of mesh. The mesh of the rack with the pinion is of considerable importance. If the rack is meshed too deeply in the pinion, the carriage can bind and be sluggish. If the rack is meshed too high, the rack may jump out of mesh and cause the carriage to skip one or more spaces.

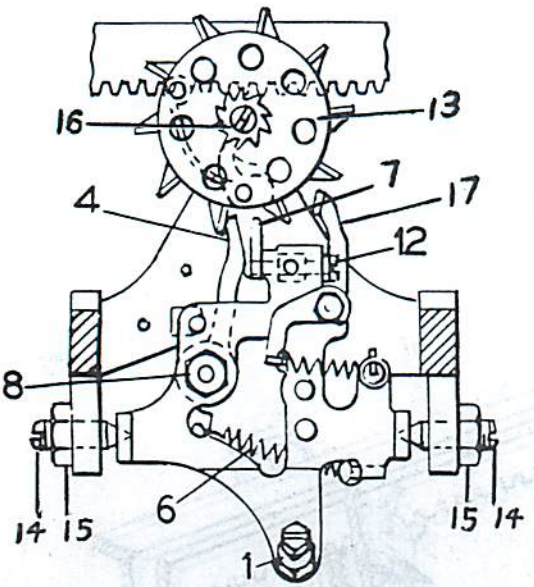
NOTE: The carriage and the ring and cylinder should be adjusted before the adjustment of the rack.

First, check that the rack teeth are in good condition, and then check that the rack is of proper pitch. Rack bail (7) should be perfectly straight and true. Check springs (6) (L & R) that they have proper tension. They should be strong enough to hold the rack *snugly in* mesh with the pinion. Check that levers (5) (L & R) do not limit the downward movement of the rack.

To adjust the rack for proper mesh, turn eccentric screw (3) down until the rack is riding completely in the pinion and not in contact with screw (3). Now adjust screw (3) upward very slowly to move the rack up slightly. The rack should not be bottoming in the pinion at either end. Check this by moving the carriage back and forth.

The rack should be free but have no end play. Adjust the end play by adjusting screw (10) in or out as needed. However, do not adjust it tight enough to bind.

When the rack release lever (5) is depressed, the rack should be raised as high as possible without interfering with the pinion pawl. Adjust eccentric screws (4) (L & R) to limit the upward movement of the rack. Check this on both the left and the right sides.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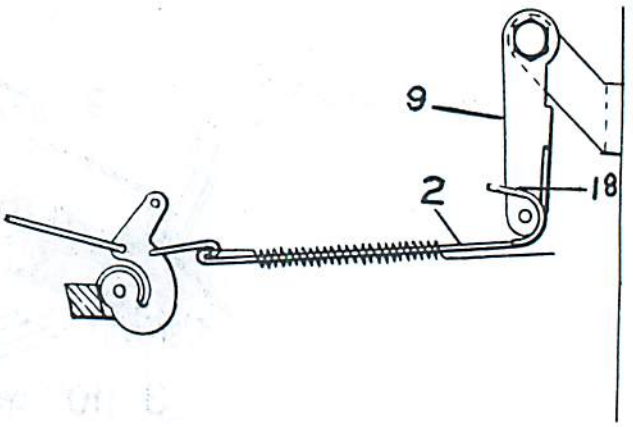
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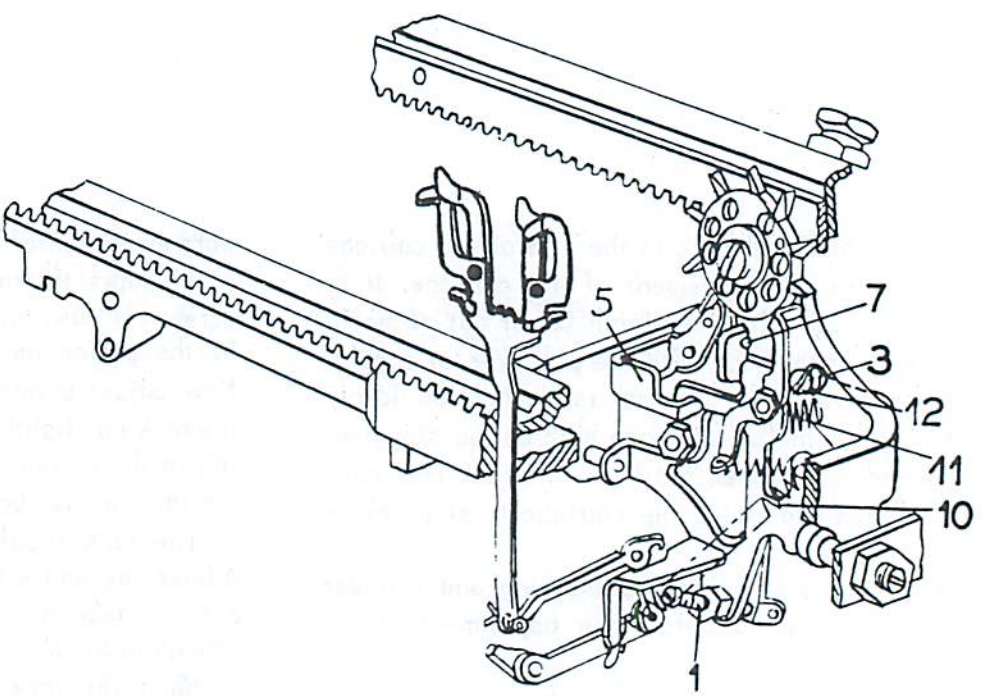
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IMPORTANT: FIRST REVIEW ESCAPEMENT IN THE GENERAL INFORMATION SECTION.

The first thing to check in an escapement section of a typewriter is the pitch of the following parts: The starwheel (13), the pinion (16), and the check pawl (17). The starwheel will usually have the pitch stamped on it. If it is not indicated, assume it is a 10 pitch starwheel. Check pawl (17) will have a number stamped on it. A "2" indicates a 10 pitch check pawl; a "1" indicates a 12 pitch check pawl.

When placing the pinion gear on the starwheel shaft, be sure that the pinion teeth are pointed in the opposite direction from the starwheel teeth. Check the condition of the pinion pawl and its spring.

The Universal Bar (9) should be free on its pivots. It should be straight and true. Check that all the springs on key lever links (2) are in good condition and that all are connected.

The distance between the loose dog (4) and the rigid dog (7) should be 1/64". This is measured by placing a 1/64" feeler gauge left to right between dog (4) and dog (7). To adjust this distance, remove loose dog (4) and replace the washer with a thicker or a thinner washer. The loose dog must fit very snugly on its pivot screw, but it also should move very freely. Check the loose dog spring.

When replacing the rocker assembly into the rocker bracket, the assembly must be placed in a 6:00 O'clock position. The bottom tooth of the starwheel must contact rigid dog (7) solidly. (The rocker is in the tripped position). At contact, this bottom starwheel tooth must point straight down, indicating full and true contact. To adjust, loosen lock nuts (15) (L & R) and position screws (14) in or out as needed. Be careful that the rocker is free – not binding.

The front limit bracket (5) should position the rocker assembly so that when the rocker is in a normal position the front edge of loose dog (4) is flush with the front edge of the starwheel tooth. To adjust, form bracket (5) frontward or rearward.

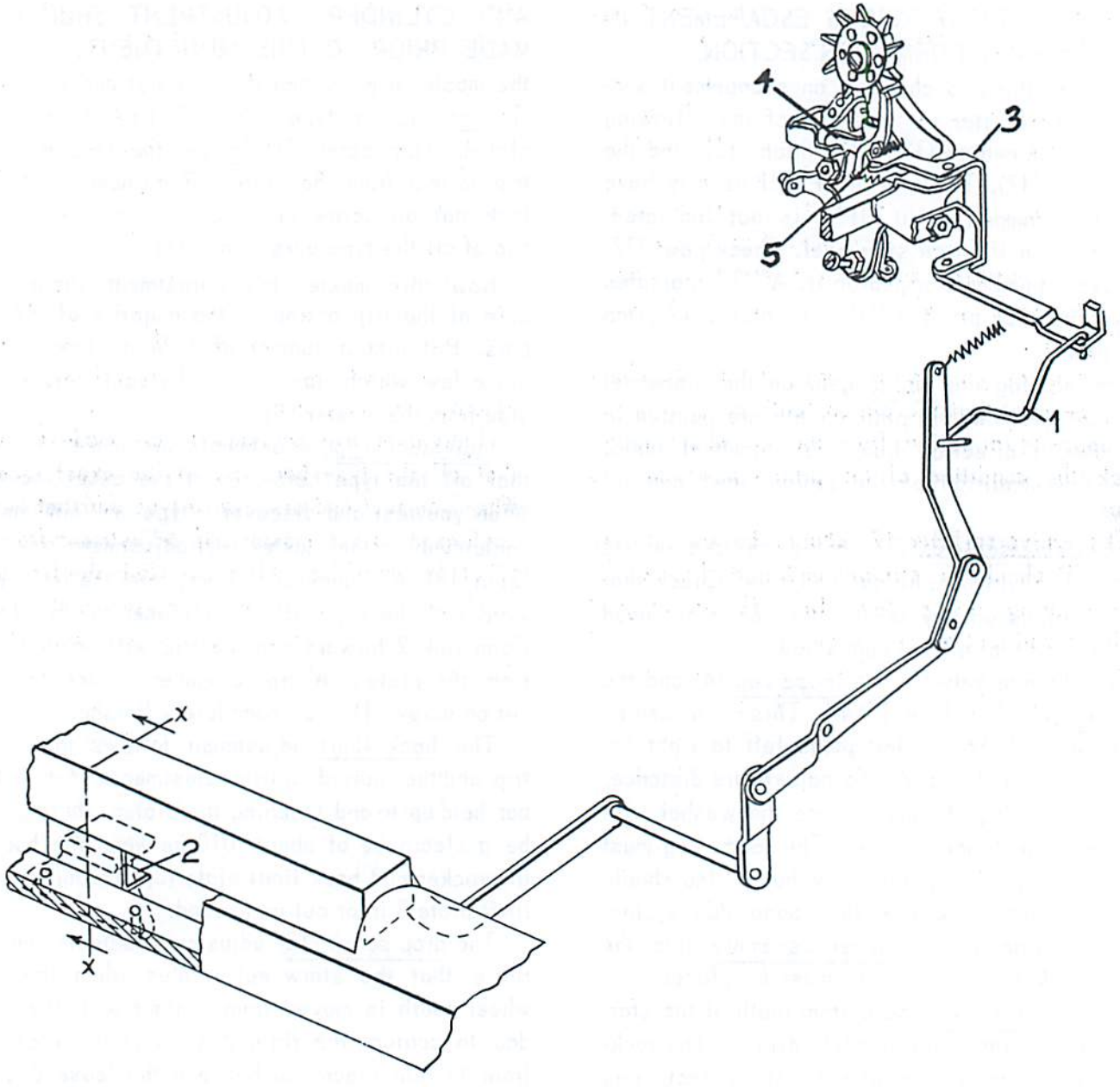
The master trip of the Royal occurs when a type bar is 3/8" from the platen. NOTE: THE RING AND CYLINDER ADJUSTMENT SHOULD BE MADE PRIOR TO THIS ADJUSTMENT. To adjust the master trip, loosen the lock nut and turn screw (1) out and the type bars will trip closer to the platen. Turn screw (1) in and the type bars will trip farther from the platen. Remember – lock the lock nut on screw (1) when you are certain the trip of all the type bars is adjusted.

Now this master trip adjustment should take care of the trip action of the majority of the type bars. But test a number of different keys. There are a few which may need individual adjusting aside from the master trip.

Individual trip adjustments are made to insure that all the type bars trip at the exact location. When you test and discover a type bar that has not conformed to the master trip adjustment from link (2) at (18). With duck-bill pliers, form the link backward and the trip will occur closer to the platen. Form link 2 forward and the trip will occur farther from the platen. Again remember – lock the lock nut on screw (1) when completely finished.

The back limit adjustment follows the master trip and the individual trip adjustments. With a type bar held up to and touching the platen, there should be a clearance of about .010 between the back of the rocker and back limit plate (3). To adjust, form limit plate 3 in or out as needed.

The drop screw (12) adjustment adjusts the distance that the starwheel rotates when the starwheel tooth is moved from contact with the loose dog to contact the rigid dog, or it is simply the front to rear clearance between the loose dog and the rigid dog. This may be checked by holding the space bar depressed, striking the "o" key, releasing the space bar, and striking the "o" key again. The edges of the "o's" should just contact each other; for example, "∞". If they are not touching, turn adjusting screw (12) in (clockwise). If they are over-lapping, turn adjusting screw (12) out (counter-clockwise). This check will also reveal the condition of the loose dog and the rocker assembly. If they are loose, the "o's" will be irregular. Recheck the rocker pivot screws and the loose dog adjustment.

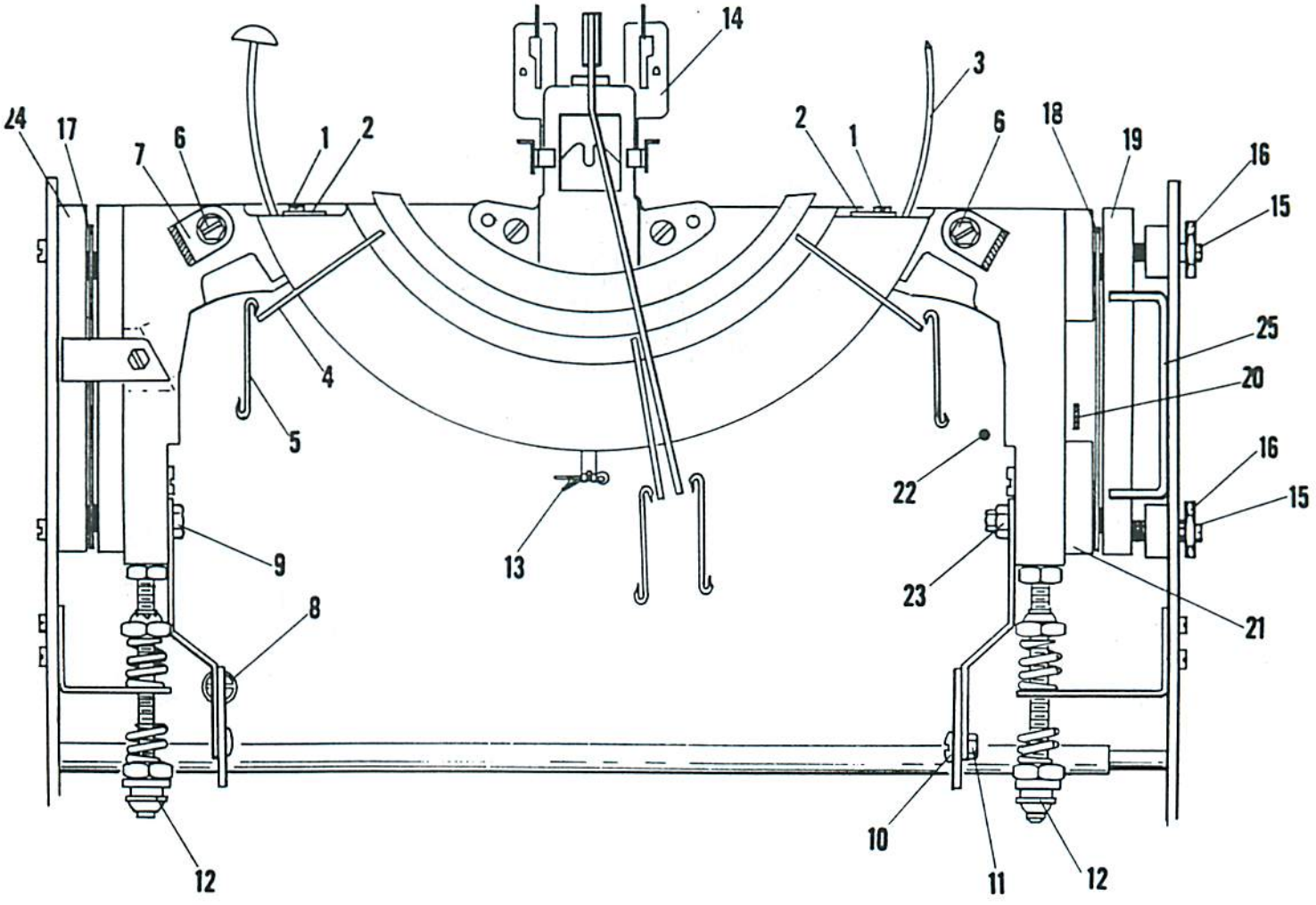


The space bar is adjusted after the escapement has been adjusted. The height of the space bar should be about 3/8" below the bottom row of keys. To adjust, form bracket (2) up or down as needed.

The space bar should have about 1/8" downward travel before it trips. After it trips, the space bar should move about 1/8".

There should be a clearance of about 1/16" between arm (3) and rocker (4), as at (5). To adjust, form link (1) as needed.

Be sure that the space bar and the linkage is perfectly free of binds. The space bar should return to normal position with a snappy action.



REMOVAL

NOTE: Segment may be removed with the Bottom Rail on the machine: however, it is easier with the Bottom Rail removed.

Remove Bottom Rail.

Remove all type bars and links. (See Type Bars and links, General Information Section).

TILT MACHINE ON ITS BACK

Remove Springs (8) L & R.
Remove Screw (9) – left side.
Remove Screw and nut (10) – right side.
Remove Nuts (12) L & R.

MACHINE UPRIGHT

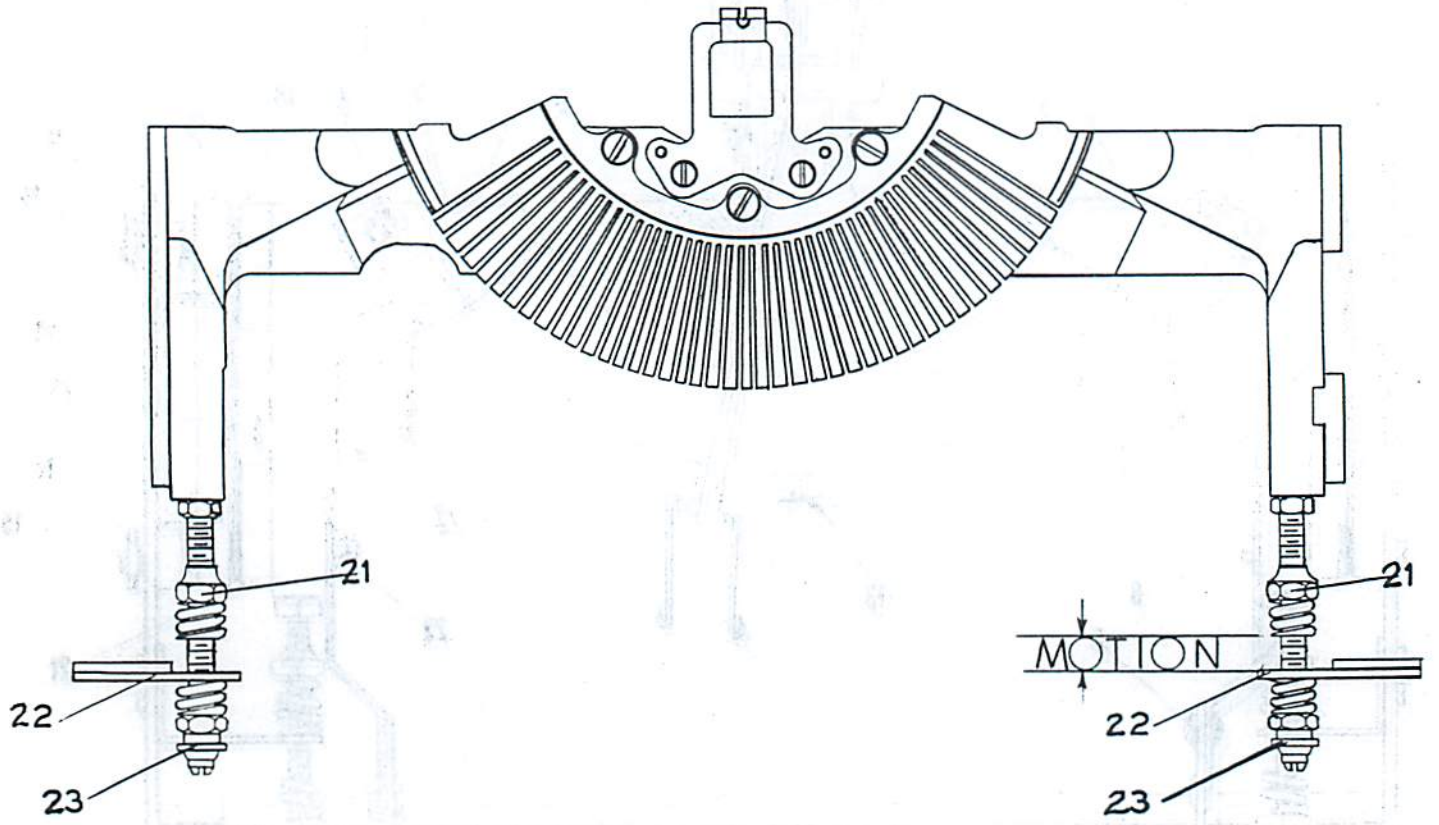
Remove Screws (15) – upper and lower.
Back out Screws (16) – slightly upper and lower.
Remove Raceway (19).
Lift Segment from base. (Guide Link (20) and link (22) around brackets).

REPLACEMENT

Position Segment into place. (Guide link (20) and link (22) into place).
Insert left Ball Retainer
Hold pressure on Segment toward left of machine.
Insert right Ball (18) and Raceway (19) into place.
Snug Adjusting Screws (16) – upper and lower.
Install Screws (15) – upper and lower.

TILT MACHINE ON ITS BACK

Install Nuts (12) L & R.
Install Screw and Nut (10) – right side.
Install Screw (9) – left side.
Install Springs (8) L & R.
Install Type Bars and Links.
Replace Bottom Rail.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MOTION
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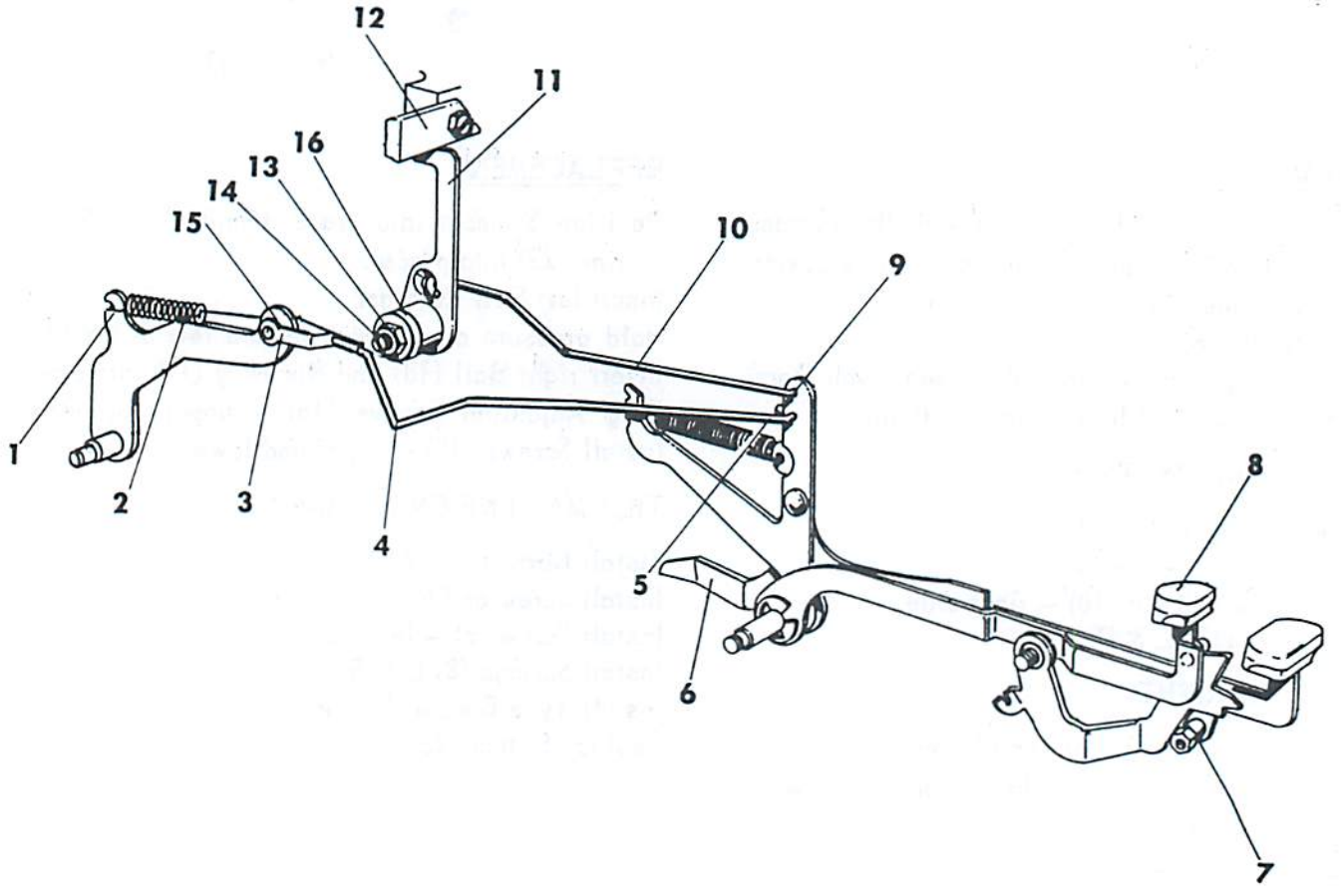
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The "on feet" adjustment of the Royal can be obtained by using the small letters or the capital letters. If you use the small letters for the "on feet", then you will use the capital letters for the motion adjustment, and vice versa. In this outline, use the small letters for the "on feet" adjustment.

NOTE: The segment must be free of binds but be snug in the brackets. The ring and cylinder adjustment. should be made before the "on feet" adjustment.

To adjust the "on feet", turn nut (23) clockwise to lower the print and counter-clockwise to raise the print. Check that both left and right springs have equal pressure on plates (22).

The segment lock arm (11) should fit snugly under plate (12). When the shift key is depressed very slowly, there should not be nicking or rubbing of arm (11) on plate (12). When the shift key is released, arm (11) should position itself under plate (12) with a snappy action. To adjust, loosen lock nut (13) and turn adjusting screw (14) to raise or lower arm (11). Link (10) may be formed to allow arm (11) to position itself under plate (12).

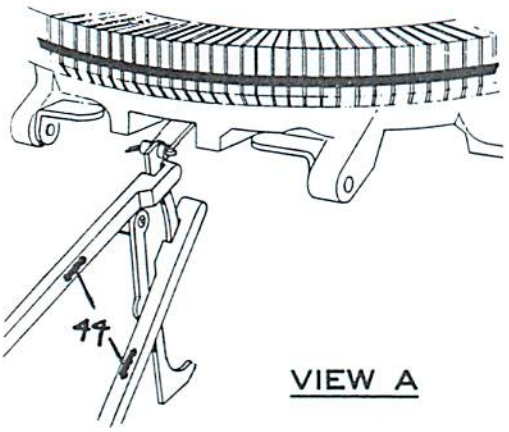
The height of the shift key should be about 1/16" above the bottom row of key tops. Form the link at (4) to raise or lower the shift key. Recheck segment lock (11) if you form this link.

The motion adjustment is made with the two upper nuts (21). By turning nuts (21) clockwise you will lower the print; turning counter-clockwise will raise the print.

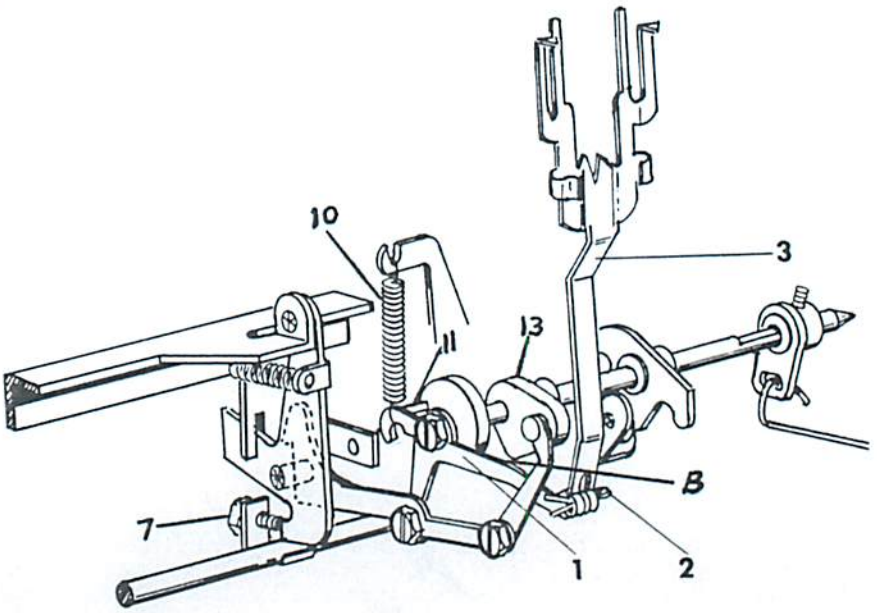
Do not attempt to adjust the motion with the shift key in the locked position. Always depress the shift key and hold it down with your finger while adjusting the motion nuts. After the motion adjustment has been made, adjust the shift lock key (8).

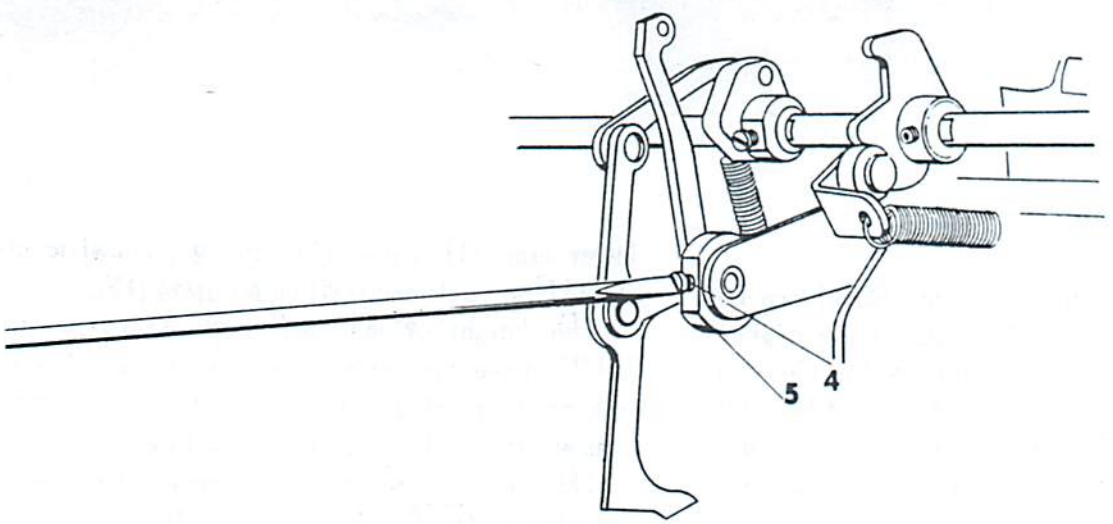
The shift lock key (8) should hold the segment down to the exact point where the motion has been adjusted. To adjust, turn eccentric nut (7) as needed.

When the shift lock key is depressed and locked, there should be about 1/8" clearance between arm (6) and the frame of the machine. To adjust, form arm (6) up or down as needed.



VIEW A





NOTE: FIRST STUDY BICHROME IN GENERAL INFORMATION SECTION.

The bichrome section of the Royal can be adjusted in four steps. These four steps are to be followed in sequence.

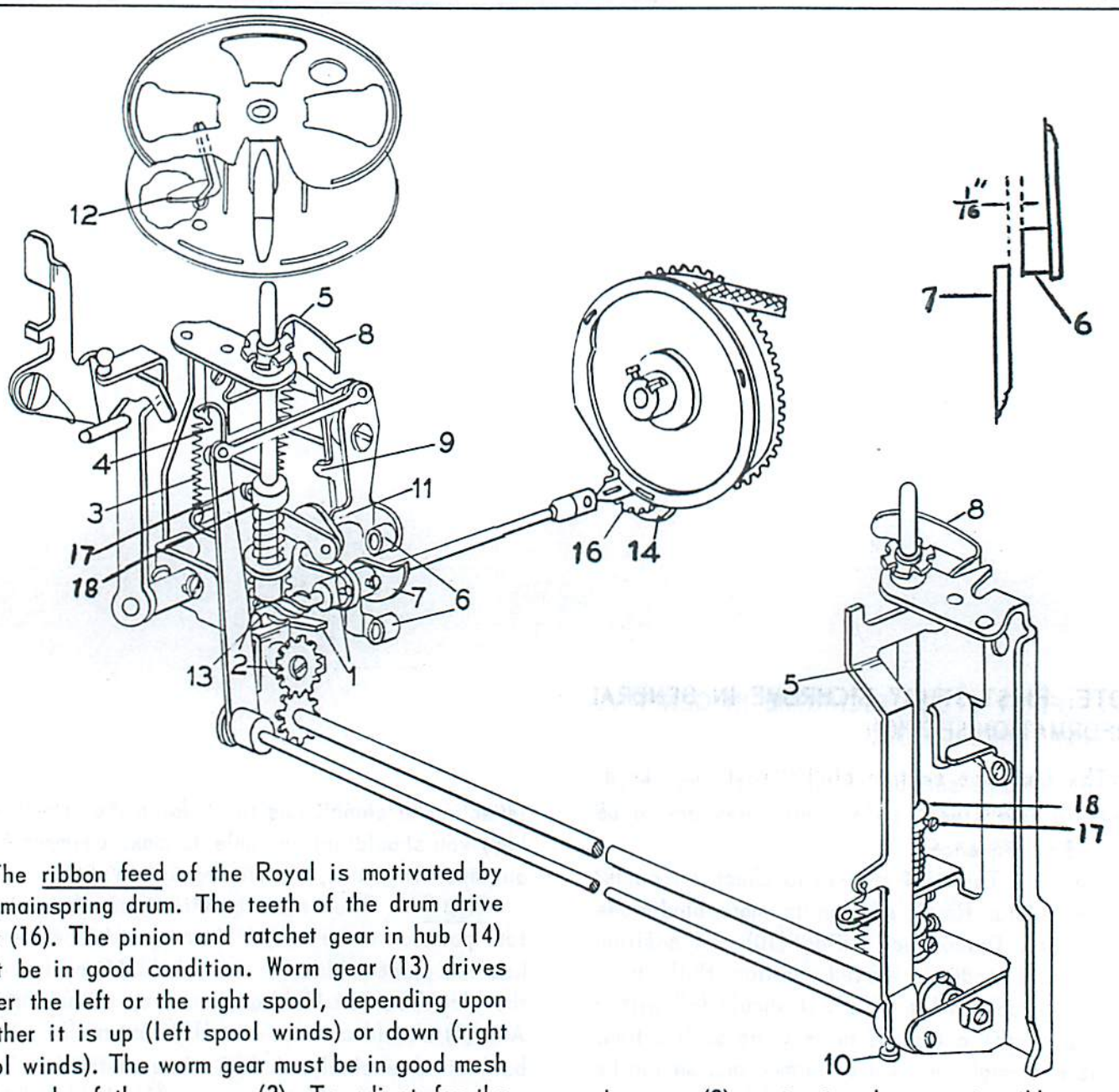
Step 1 – The first step is to check for binds. This particular Royal section is more bind-prone than others. Disconnect spring (10) and position the bichrome handle in the red position. Pull ribbon vibrator (3) up and let it fall. It should fall with a free and snappy action. If there is no such action, the vibrator might be bent or formed and should be replaced. When this section is bind-free, reconnect spring (10).

Step 2 – The rest position is the normal position of the ribbon vibrator when not in use. The top of the ribbon should be about 1/16" above the type bar guide. To adjust, loosen screw (4); hold vibrator at 1/16" above the type bar guide; turn washer (5) until stud (11) just contacts the back edge of lever (1). Tighten screw (4).

To check this adjustment, depress the shift key and watch the ribbon vibrator. It should not move at all. If the ribbon vibrator goes down with the segment, readjust the rest position. Recheck that the ribbon is 1/16" above the type bar guide. Another way to check is to position the bichrome lever in the stencil position. Using the underscore key, you should not be able to make an impression on paper. If you do, the vibrator is too high.

Step 3 – When the vibrator is raised to a perfect position to be struck by a type bar, we say it has the proper "throw". Set the bichrome lever in the black position. Hold a type bar up to the platen. Arm (1) should contact cam (13), as at "B", fully but not excessively. At the same instant that the type bar contacts the platen, arm (1) should contact cam (13). To adjust, loosen lock and adjust screw (7) in to raise arm (1); adjust screw (7) out to lower arm (1).

Step 4 – Set the bichrome lever in the black position. Strike the underscore key several times. The resulting print should be in a clear, black line. Now set the lever in the red position and repeat the action. If in either instance the line is not clear, the vibrator arm will have to be formed up or down, as needed. To adjust, use forming tools No. 44 and form arm (1) up or down as needed (view A). This final step is usually unnecessary if the first three have been performed properly and all parts are in good condition.



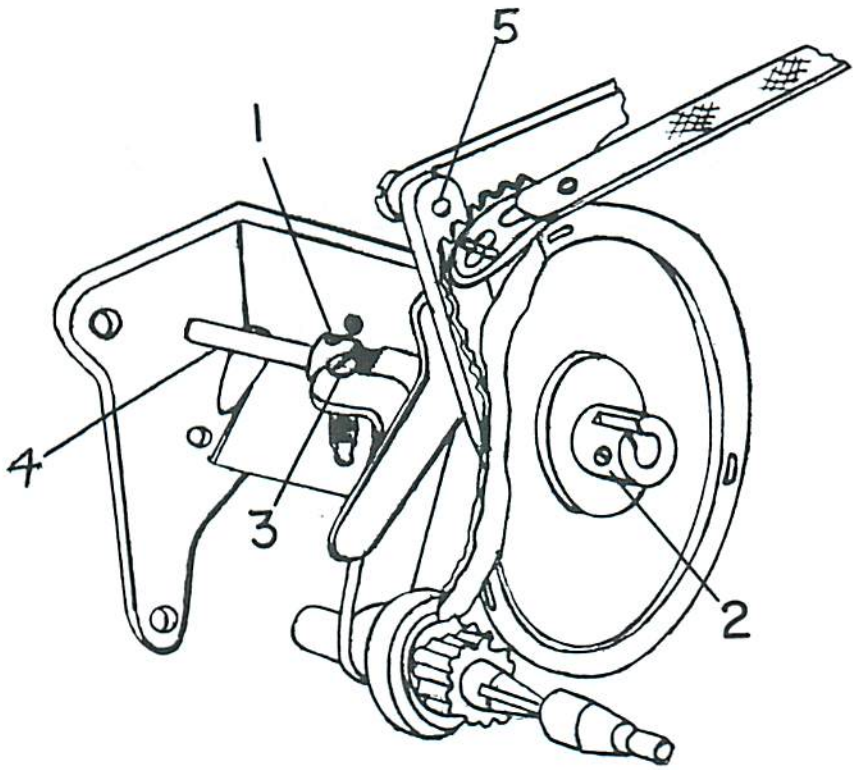
The ribbon feed of the Royal is motivated by the mainspring drum. The teeth of the drum drive gear (16). The pinion and ratchet gear in hub (14) must be in good condition. Worm gear (13) drives either the left or the right spool, depending upon whether it is up (left spool winds) or down (right spool winds). The worm gear must be in good mesh with each of these gears (2). To adjust for the mesh of the worm gear with the drive gears, form limit arms (1) either up or down as needed.

The ribbon spool shafts must be free of binds but should drag slightly so that the ribbon will not turn too freely and spin off the spool. To adjust for the drag on the spools, loosen screws (17) and move collar (18) left or right, either up or down, as needed.

The ribbon reverse is activated when the ribbon on one spool has been used up. Then trip (12) will push arm (8) (L or R) back, which will position roller (6) (upper or lower) into the path of cam (7). Cam (7) will force worm gear (13) either up or down. This will allow worm gear (13) to drive the other gear (2), activating the opposite ribbon spool for use.

Reverse arms (8) should be free of binds. They should snap back into place without any sluggishness. Trip lever (12) on the ribbon spool should push arm (8) back about 1/4". Form arms (8) as needed.

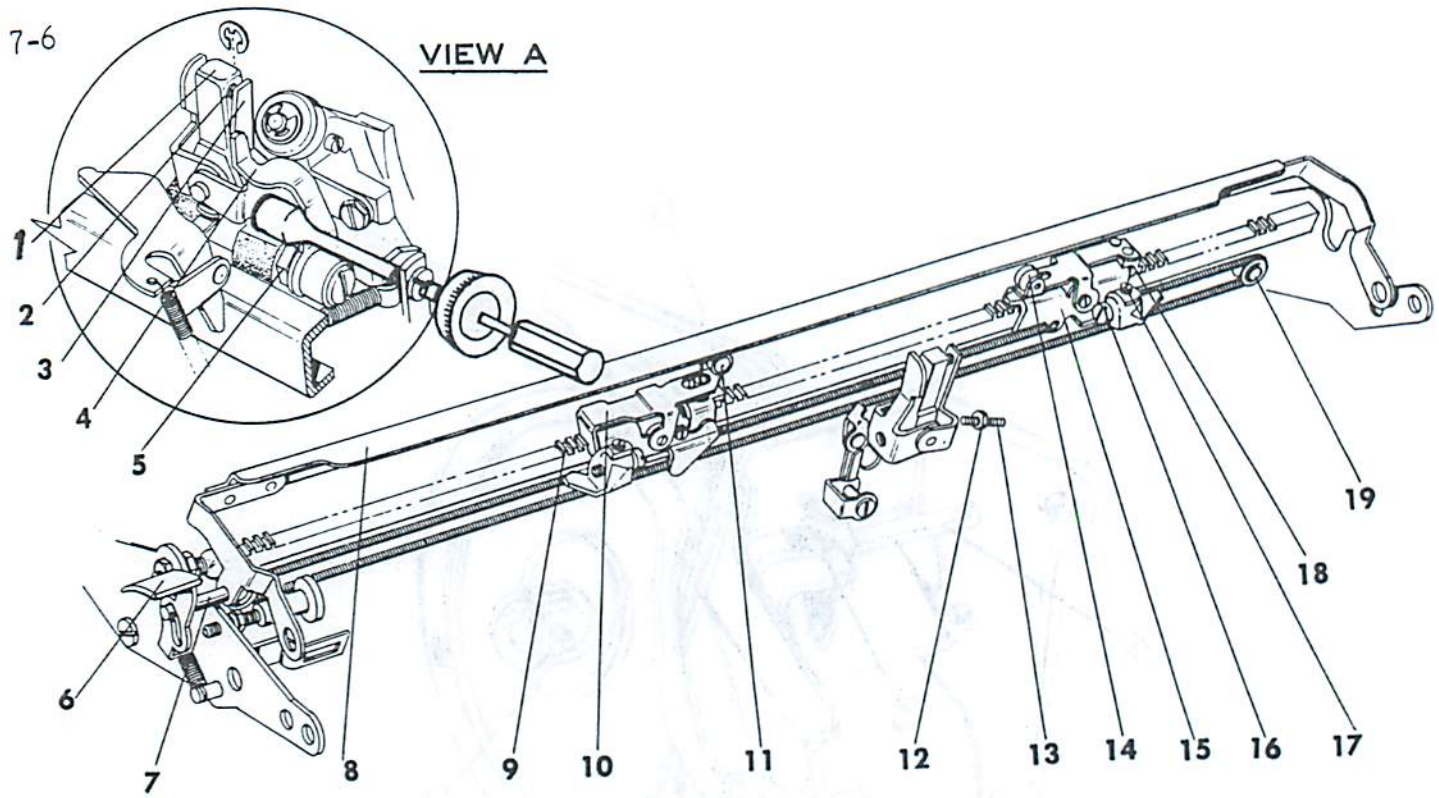
The upper and lower rolls (6), in neutral position, should clear reverse cam (7) by about 1/16". This distance should never be less than 1/16". To adjust the upper roll (right reverse), loosen screw (10) and adjust the roll 1/16" from reverse cam (7). To adjust the bottom roll (left reverse), form arm (9) for 1/16" clearance between the roll and the cam. Recheck the freedom in the arms.



The mainspring is located at the left rear of the machine. To remove the mainspring barrel, disconnect the drawband and release all tension on the mainspring. Loosen 2 screws (1) and loosen screw (2). Push shaft (4) toward the front of the machine. Remove the mainspring barrel. As the shaft is removed, lever (5) will be loosened. This is the back space lift lever. Remember when replacing the shaft to position this lever into place.

To increase the mainspring tension, turn screw (3) counter-clockwise (left). To decrease the mainspring tension, turn screw (3) clockwise (right).

Never increase the tension to overcome a bind in the carriage. This will just add to your problems.



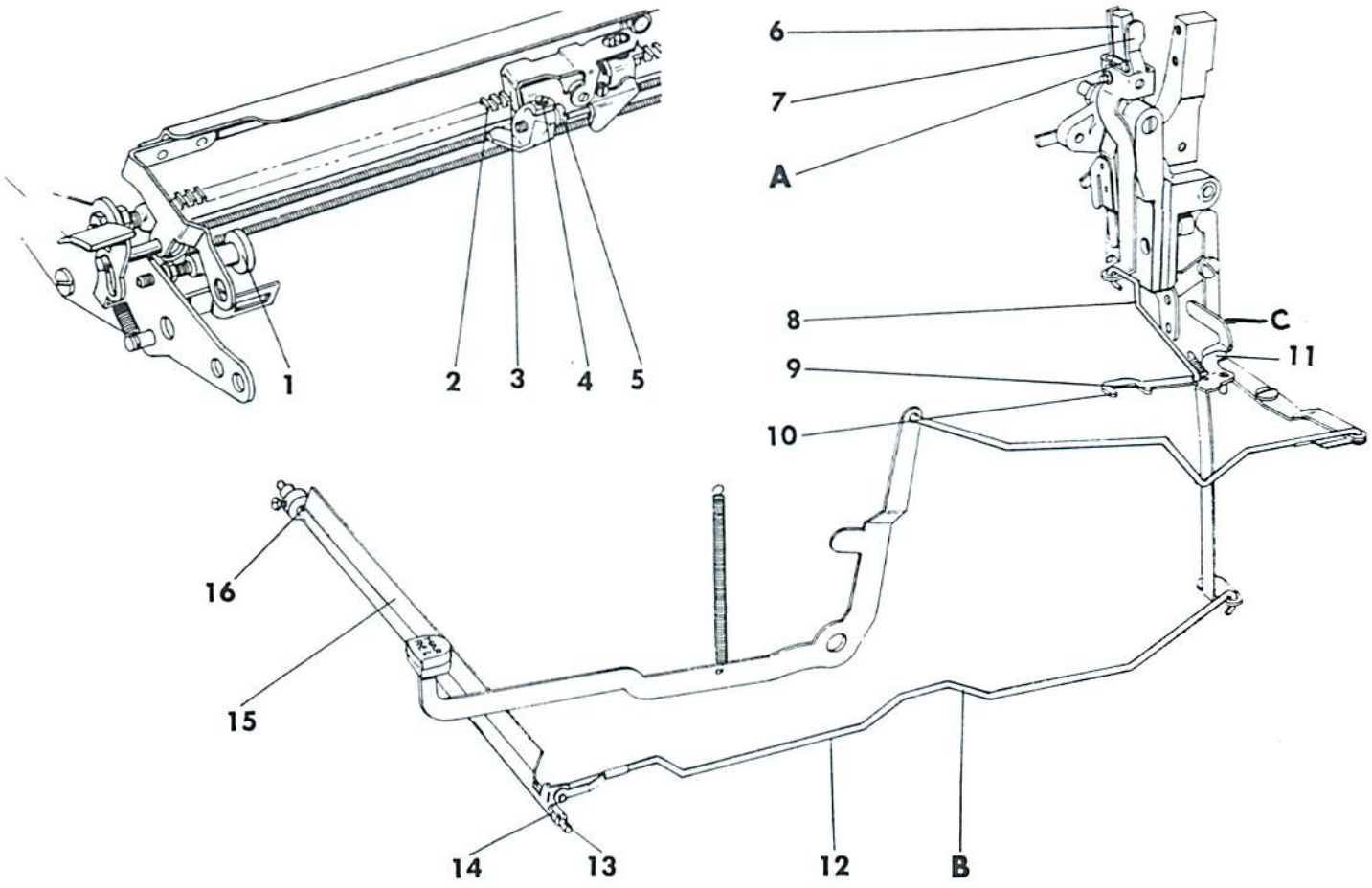
Before beginning the margin adjustments, the center post should be checked for proper fit. The center post (1) should not have looseness or left to right shake. To tighten the center post, use socket wrench #S–263 and loosen lock nut (5). Tighten the fulcrum screw until there is no play. Do not over-tighten until the center post binds when the margin release key is depressed.

The left and right margins must operate freely on the margin rack. They should travel toward the center with a snappy action when either release lever is pulled forward. The margin bails (8), both left and right, should be straight and true.

There are two adjustments of the left margin. The first is the over and under banking adjustment. The second is the locator adjustment.

Step 1 – To adjust the left margin for the proper banking, position the left margin stop at any point. Move the carriage until the margin contacts the center post. Press the carriage firmly against the center post. Depress the space bar one time. Now carefully push the carriage toward the center of the machine. The pinion pawl should drop into position when slight additional pressure is applied. Do this about five times. Each time listen for the click of the pinion pawl as it drops into position. To adjust, turn screw (16) in or out. The pinion pawl should click after locator pawl (3) has been pushed into the center post and slight pressure has been applied.

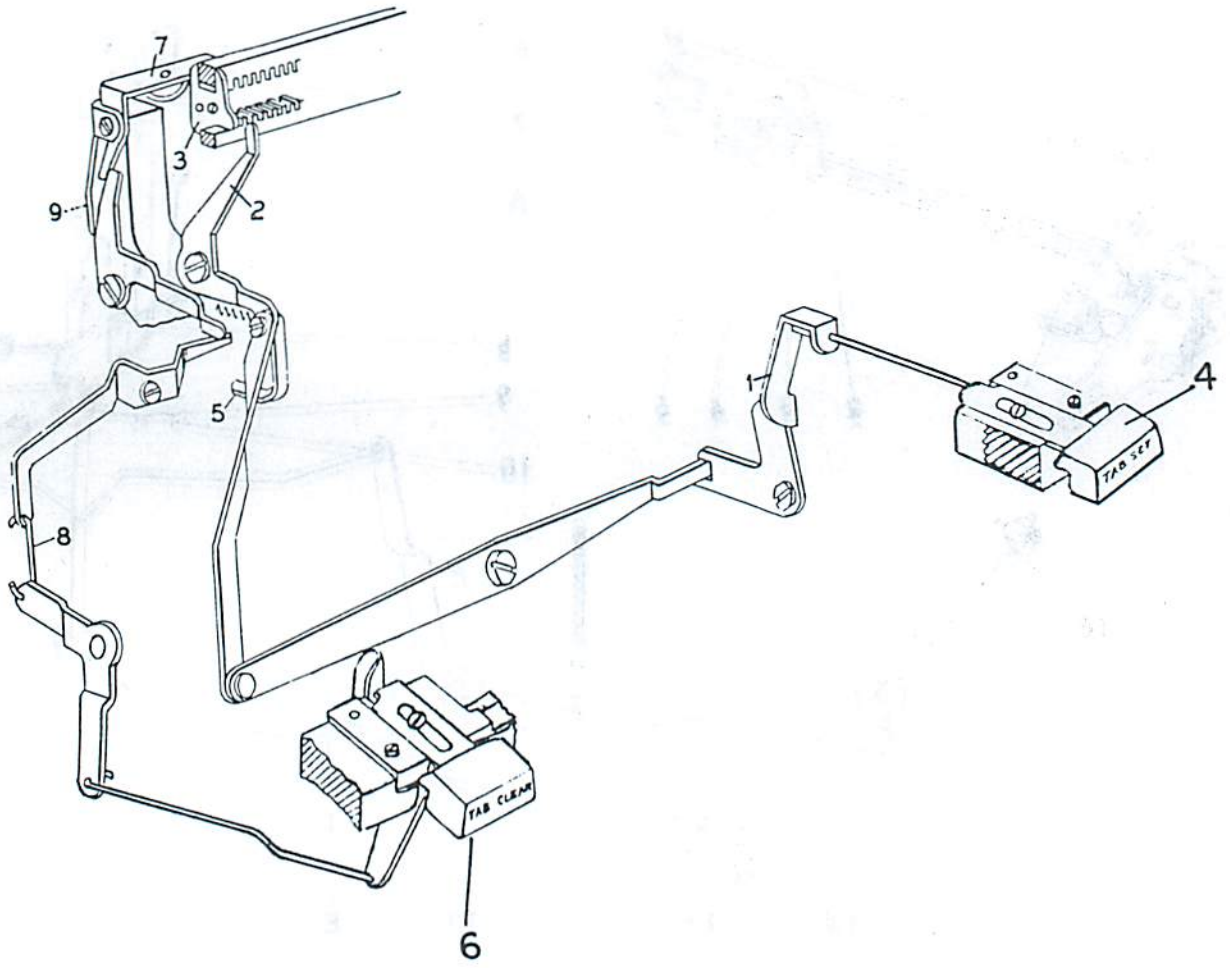
Step 2 – The locator is checked by positioning the left margin at the extreme left position. Then move the carriage to the 10 or 20 or 30 position on the scale – either will do. Pull the left release lever forward. The margin stop should contact the locator (3) with a quick and snappy action. Slowly return the release lever backward. The heel of the margin stop should seat itself directly into the tooth of the margin rack. To adjust, loosen the lock nut (12) and turn screw (13) in or out as needed.



The line lock and the margin release are the two adjustments for the right margin. The head of screw (5) must have at least a 2/3 bite on line lock lever (7). Form the arm at point "C" until the center post is in the proper position. There must be one space clearance between lock lever (7) and the center post (6). Also, lock lever (7) must lie flat against the center post when activated. Form *lock lever (7)* as needed.

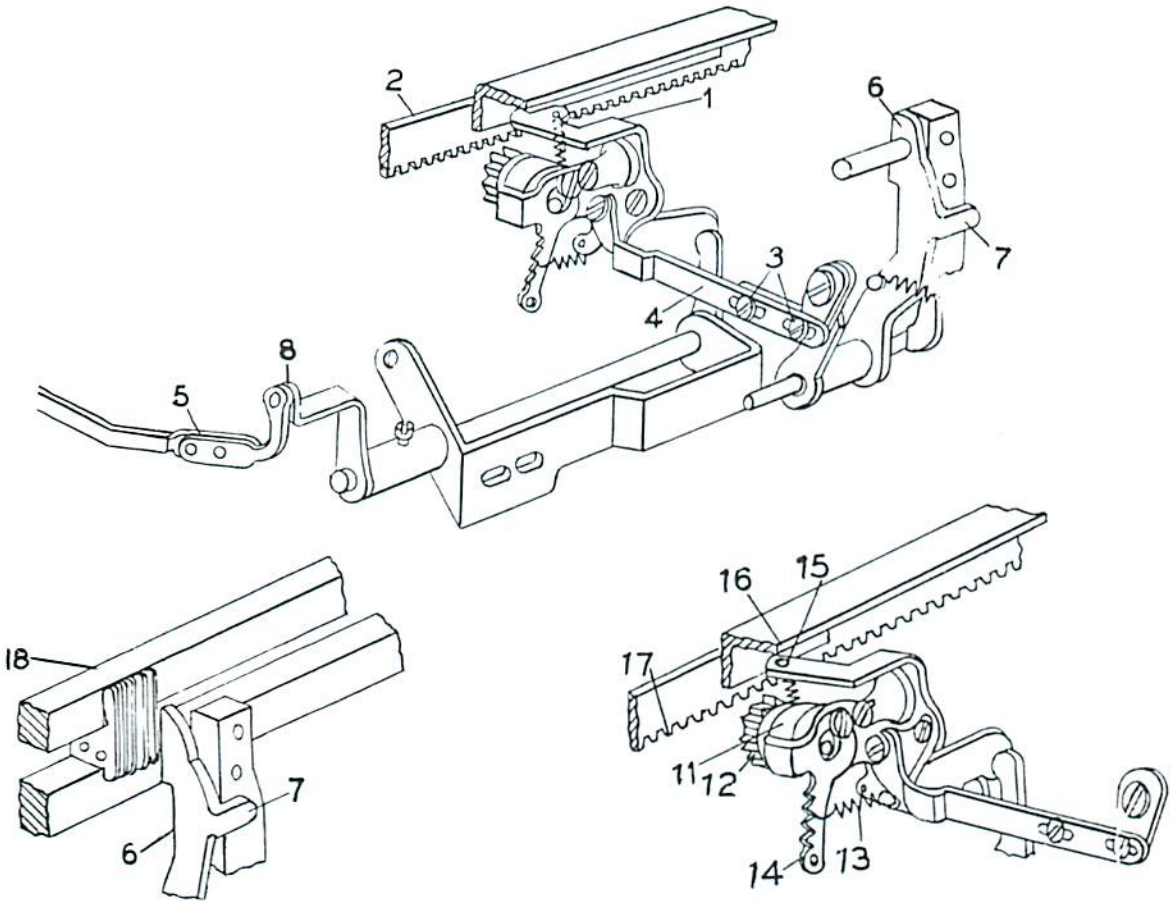
When lock lever (7) is against the center post (6), line lock (15) should lock the keyboard completely. To adjust, form link (12) at point "B"

Using the space bar, space into the line lock position. Depress the margin release key. There should be no movement of the carriage. To adjust, loosen set screw (4) and turn screw (5) in or out until there is no movement of the carriage when the margin release key is depressed.



The tabulator set key should set a tab blade completely. The tab set arm (2) should contact a blade squarely – not favoring one side or the other. To adjust this, adjust tab rack (3) to the left or to the right as needed. Tab set arm (2) should push the blade in completely so that the blade will stay *in the set position*. To adjust this, form arm (1) back or forth as needed. In an inactive position, the set arm (2) should clear all of the unset tab blades by about 3/16". To adjust this, form the extension of arm (5) in or out.

The tabulator clear roll (7) should unset all set blades. The roll should roll very *lightly* on all unset tab blades all the way across the carriage. To adjust, form link (8) as needed. CAUTION: Be sure that roll (7) does not contact the set blades when the clear key is not depressed. There should be about 1/16" clearance between the set blade and the roll in the inactive position. Readjust link (8) if necessary.



NOTE: BEFORE ADJUSTING THE TABULATOR, REMOVE THE PLATEN, THE FEED ROLLS, AND THE PAPER PAN SO THAT YOU MAY OBSERVE THE ACTION OF THE TABULATOR.

There are five check points when adjusting the tabulator.

Step 1 – At this point you must consider keeping the tab key in its normal upright position while you adjust the tabulator. It is a good idea to place a rubber band around the tabulator key top and loop the other end around the tab set key. This will insure that the key lever does not drop down while you are making the following adjustments.

Step 2 – Loosen screws (3). Check the distance between gear (12) and teeth (17). There should be about 1/8" clearance between them. To adjust, loosen screws (5) to shorten or lengthen this distance.

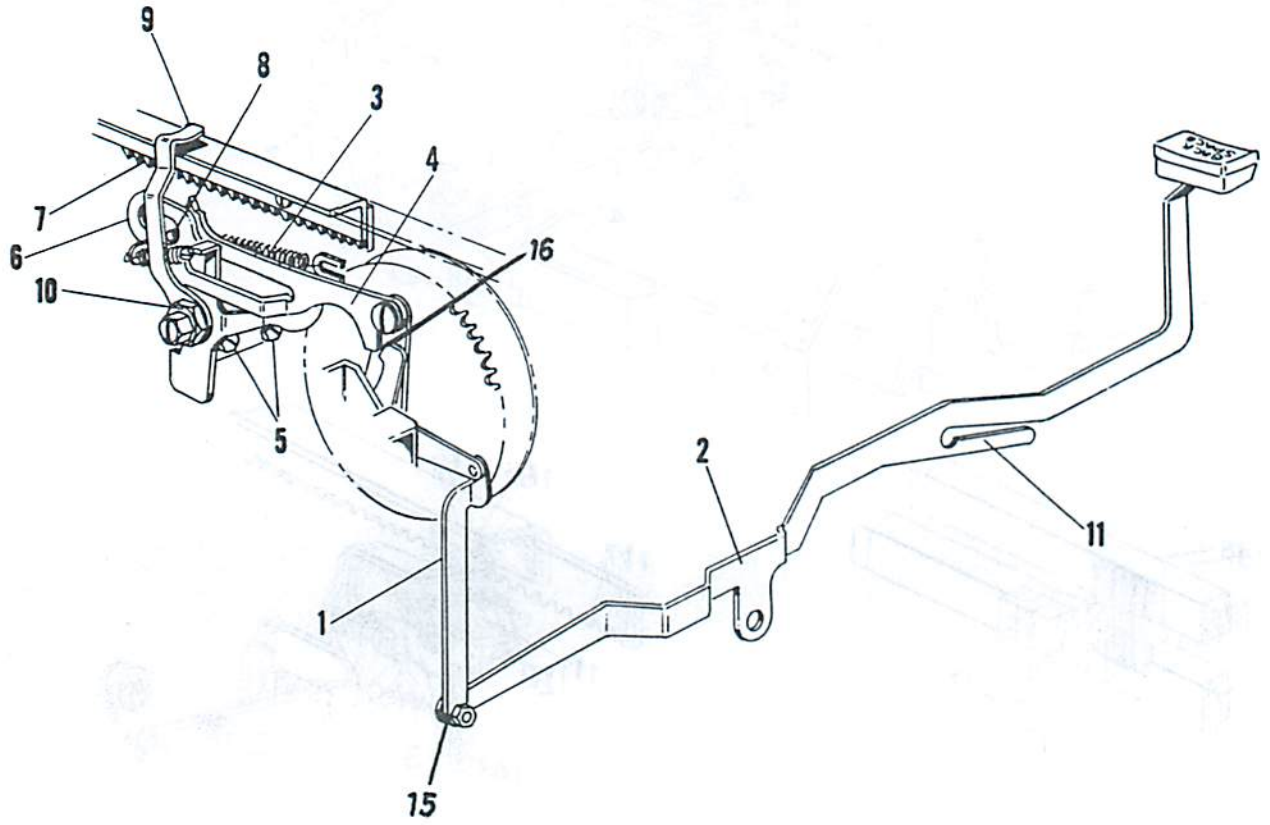
Step 3 – Depress the tab key slowly. Lift arm (15) should contact rack bail (16) before gear (12) *has meshed* completely in teeth (17). Hold the tab key down completely. Check that gear (12) is about two-thirds in mesh with teeth (17). To adjust, form arm (15) up or down as needed. Never should gear (12) be lifting the rack. The lifting of the rack has to be done by arm (15). Recheck the upper limit screws in the rack adjustment section.

Step 4 – Tab rack 18 should be properly adjusted before this step. (See Royal Tabulator Set and Clear Section). Select a tab stop and set it in the tab rack. (Screws (3) should still be loosened.) Press tab blade (6) in with your thumb. The tab blade should contact the tab set stop with about 1/8" bite. To adjust, form limit (7) in or out as needed.

Step 5 – Hold the tabulator key depressed. Hold the tab blade in with your thumb to limit (7). Tighten screws (3). NOTE: a third hand would be handy here, so you might need some help.

Recheck all five steps. It is possible to disturb one adjustment by over-adjusting another.

NOTE: To adjust for more or less breaking action, move spring (13) up or down on arm (14). Move up for less braking and down for more braking power.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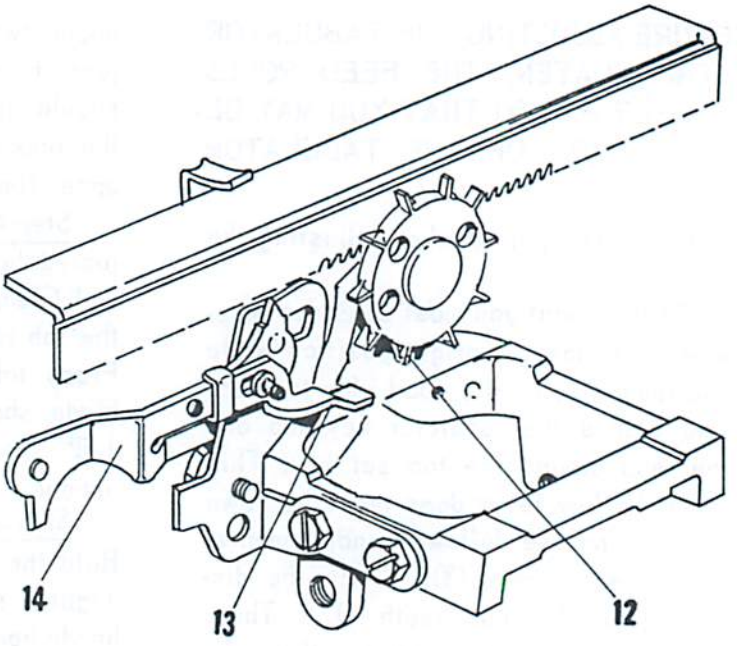
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The back spacer should operate freely, so check for binds in this mechanism. Check that springs (3) and (8) are in good condition and properly installed. NOTE: Follow these steps in sequence. Remove the platen, feed rolls, and paper pan so that you may observe the back spacer adjustment.

Step 1 – Remove screw (15). Back space pawl (4) should line up perfectly straight with the escapement rack teeth (7). Pawl (4) should be in the same plane front to rear as the rack. To adjust, form bracket (6) frontward or rearward.

Step 2 – There should be about 1/8" clearance between the top of the back space pawl tooth and the escapement rack teeth. To adjust, loosen screws (5) and move bracket (6) up or down. CAUTION: Do not get the pawl out of line with the rack (Step 1). Recheck Step 1.

Step 3 – Replace screw (15). There should be 1/16" clearance between pawl (1) and pawl (4), as at (16). To adjust, form the back end of arm (2) up or down.

Step 4 – Slowly depress the back spacer key. Notice if the pawl (4) tooth enters directly into the rack teeth. To adjust, form bracket (6) to the left or right. Recheck the clearance at (16).

Step 5 – With the back spacer key fully depressed, the carriage should back space one and only one space. To adjust form limit (11) up or down.

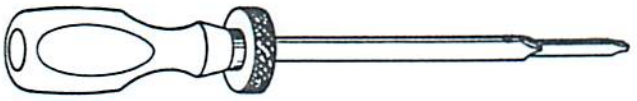
Step 6 – Hold the back spacer key fully depressed. Pawl (13) should just barely contact the tooth on starwheel (12). To adjust, loosen the lock screw and move arm (13) left or right.

Step 7 – With the back spacer key held down, pawl (9) should contact the top of the rack fully. To adjust, turn eccentric screw (10) as needed.

NO. 29 OPEN END WRENCH

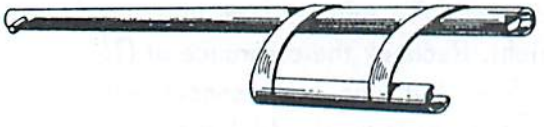
NO. 34 OPEN END WRENCH

NO. A-S-83 OPEN END WRENCH



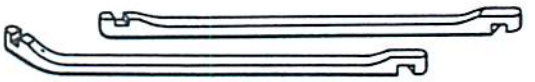
NO. A-S-167 COMBINATION SCREWDRIVER

NO. 35 ALIGNING WRENCH



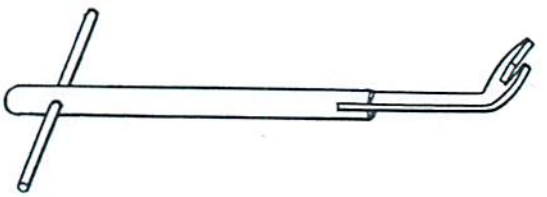
NO. A-PS-78 BALL PINION LOADER

NO. S-263 CENTER STOP SOCKET WRENCH



NO. 44 RIBBON VIBRATOR ARM BENDERS

NO. PS-30 DRAWBAND HOOK



NO. AS-187 MOTION STOP WRENCH

NO. 3-KM HOLLOW SCREWDRIVER

NO. 85 COMBINATION SCREWDRIVER

NO. 2-KM BACK SPACE BENDER

NO. 63-KM WRENCH

NOTES

NOTES

UNDERWOOD INDEX

Illustrations provided through the courtesy of Olivetti Underwood Corporation.

Technical Material written by the author.

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Platen	U – 13
Feed Rolls	U – 14
Universal Bar	U – 15
Escapement	U – 16
Space Bar	U – 18
Segment	U – 20
Ring and Cylinder – On Feet	U – 22
Motion	U – 24
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Ribbon Spool Shafts	U – 28
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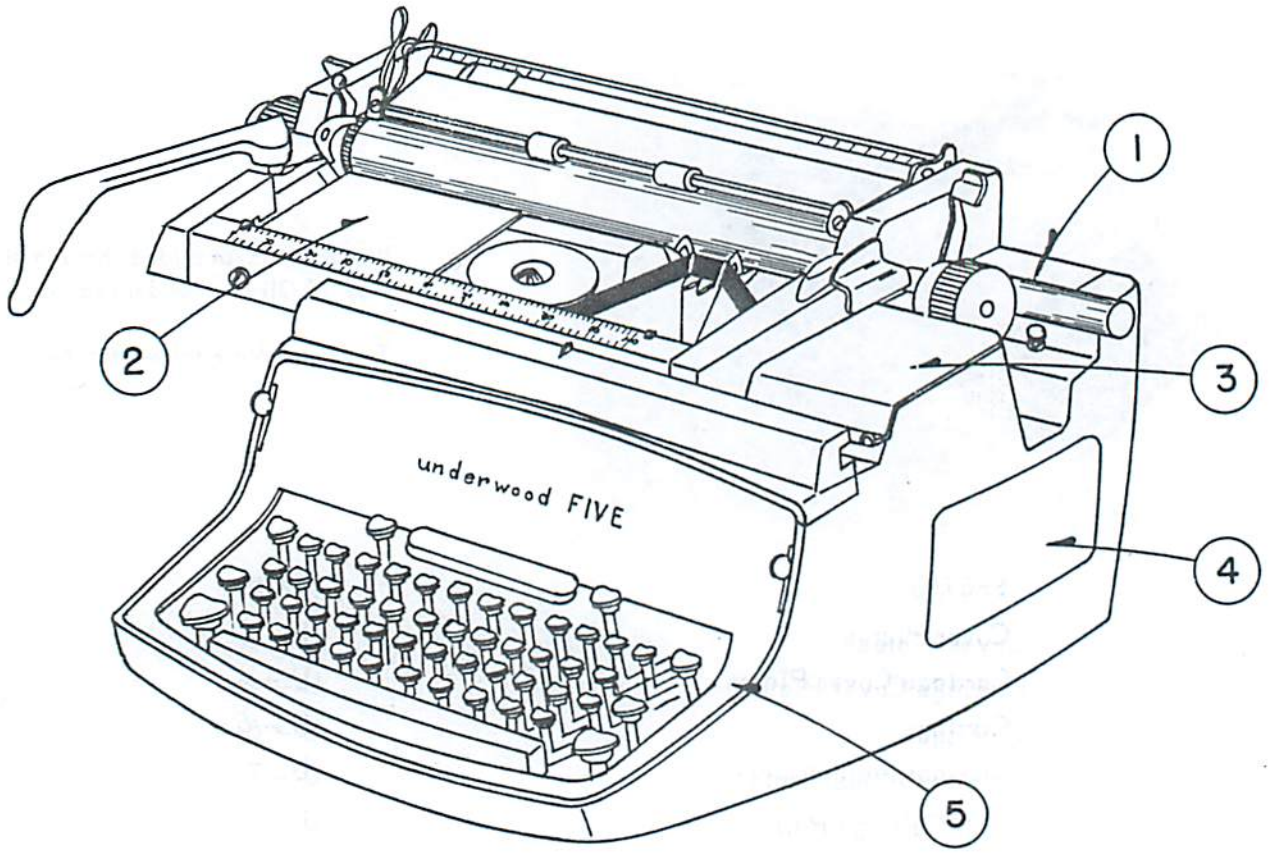
Tabulator Set and Clear	U – 32
Tabulator	U – 33
Left Margin	U – 34
Right Margin	U – 35
Back Spacer	U – 36
Tools	U – 37


underwood FIVE
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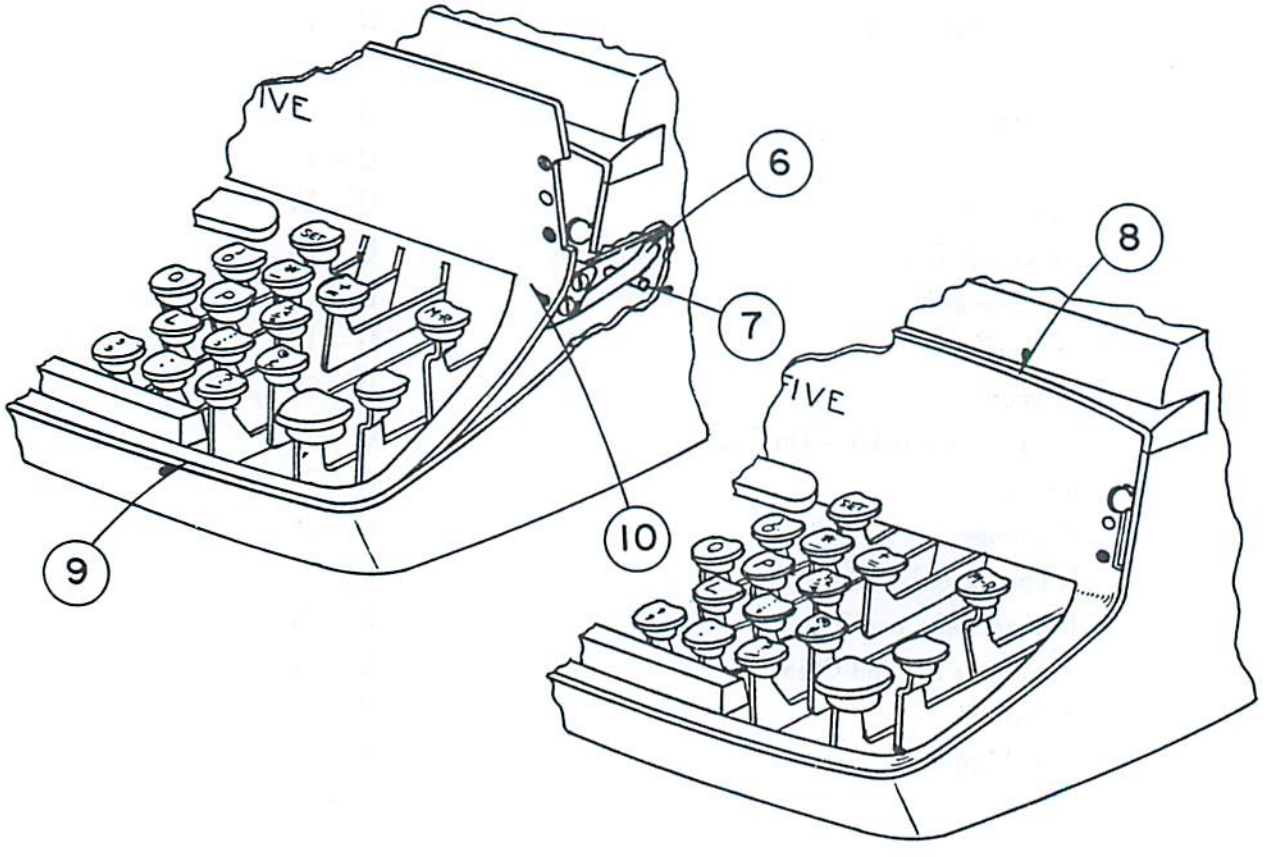
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REMOVAL

Move Carriage to Left.
Place Screwdriver at (1) Pry out R.
Remove Back Cover Plate.

Reach under Right Rear at (4).
Push the back of Right Panel out.
Reach under Left Rear.
Push the back of Left Panel out.

Slide Cover Panel (2) out to left.
Push left end to rear to remove.
Slide Cover Panel (3) out to right.
Push right end to rear to remove.

Reach up under front edge of machine.
Push Cover Panel (10) up at (9).
Lift up at (8) – Remove Panel (10).

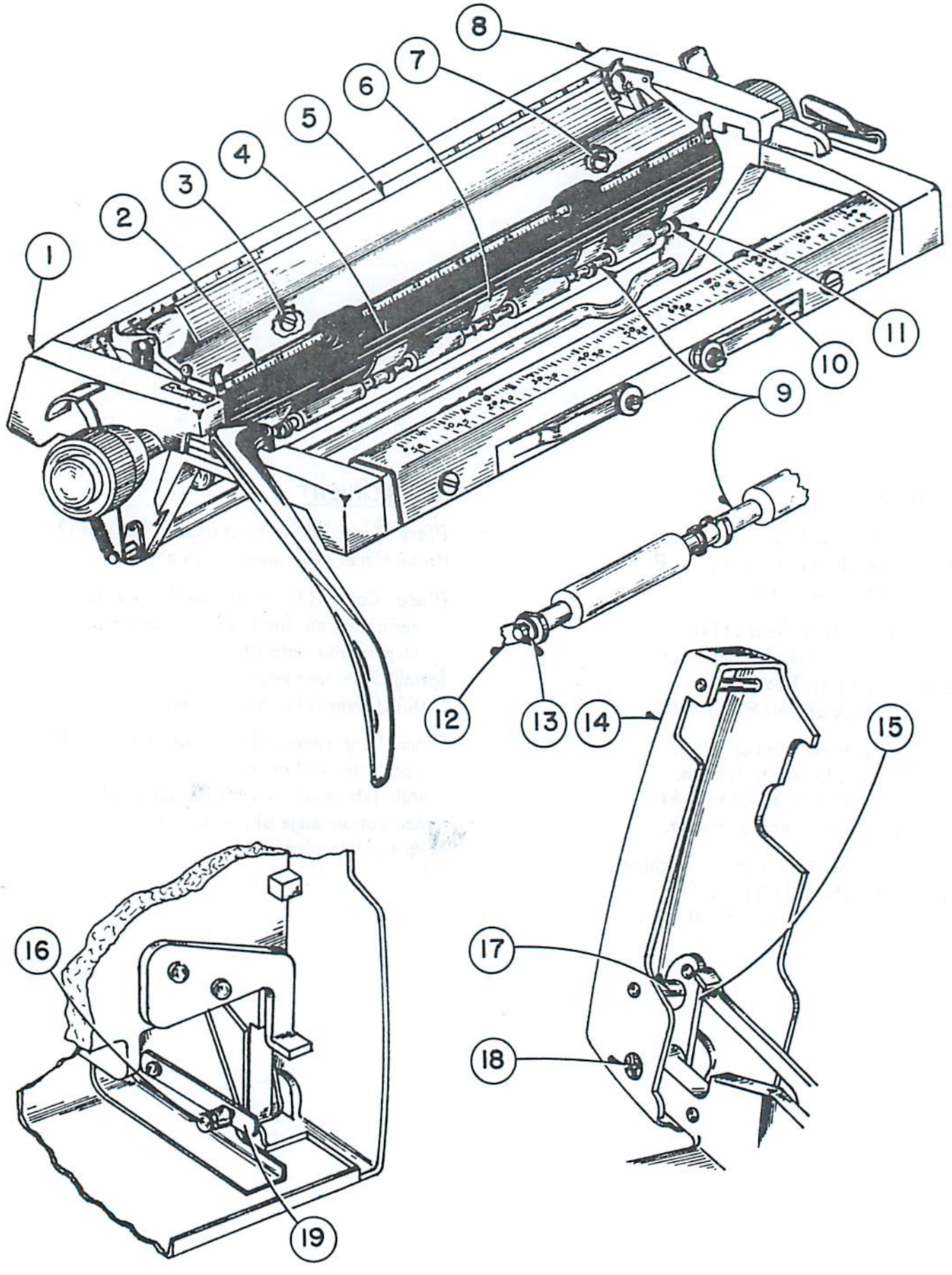
REPLACEMENT

Place Panel (10) at front edge of base at (9).
Press Panel (10) down and in at (8).

Place Cover (3), with small hole to center of machine, on front edge of bracket with limit stop inside main frame.
Spring down rear edge.
Install Cover (2) in same manner as (3).

Place front edge of Panel (4) in first – then snap rear into machine base.
Install left cover in same manner as (4).
Place bottom edge of rear Cover in first.
Snap top into place.

CARRIAGE COVER PLATES UNDERWOOD



UNDERWOOD CARRIAGE COVER PLATES

REMOVAL

Lift L & R Covers up, as at (14).
Remove Platen.

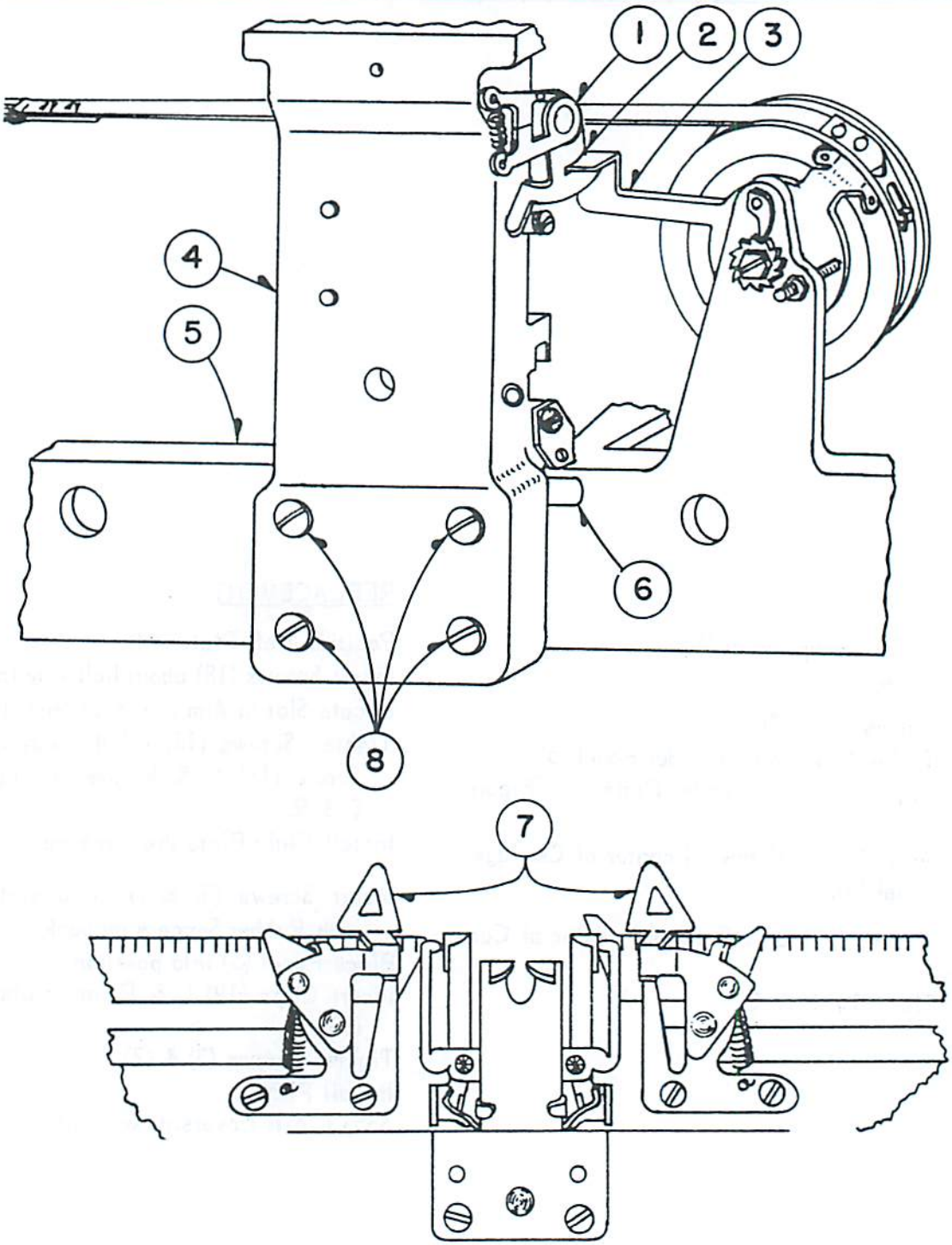
Remove Screws (3) & (7).
Remove Rubber Spacers from under Panel (5).
Remove Clips (16) L & R under Plate (5). (Figure 2).
Push Clips (19) L & R toward center of Carriage.
Remove Panel (5).

Remove Screws (18) L & R toward center of Carriage.
Remove Plate (14) L & R.

REPLACEMENT

Position Left Plate (14).
Insert Screws (18) about half way in.
Locate Slot in Arm (15) over Shaft (17).
Tighten Screws (18) all the way in, making sure Screw (18) L & R goes through hole in (15) L & R.
Install Right Plate the same way.

Insert Screws (3) & (7) into slots in Panel (5) with Rubber Spacers on back side.
Place Panel (5) into position.
Insert Clips (19) L & R into slots in Screw Head (18).
Tighten Screws (3) & (7).
Install Platen.
Snap L & R Covers down tight.



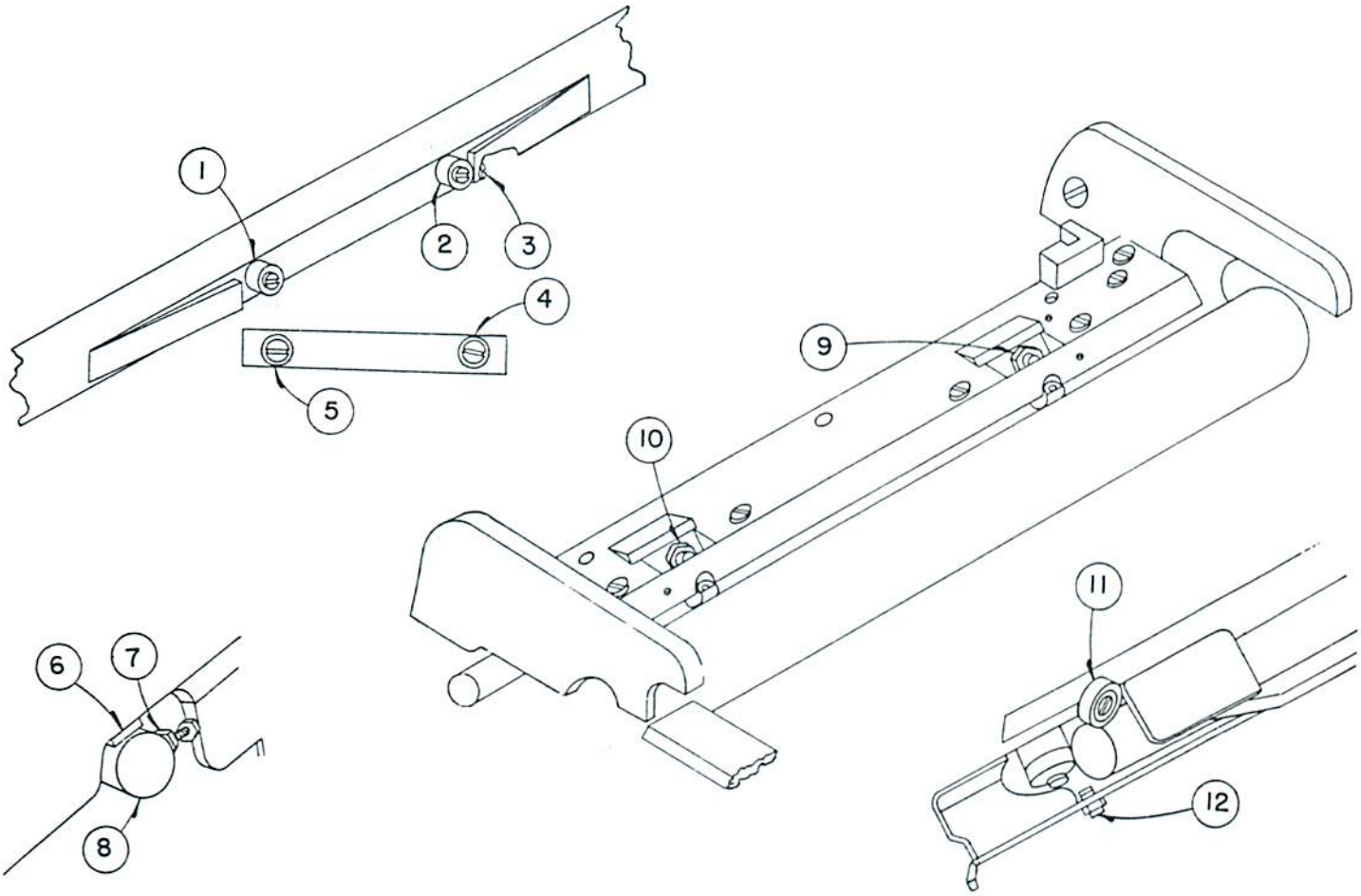
REMOVAL

Remove Cover Plates.
Remove Screws (8) (4).
Remove Tab Frame (4). (Notice shims as at 6)
Lower Card Holders (7).
Disconnect Drawband.
Hold down on Margin Release Key and move Carriage left and off. (Facing machine from the front).

REPLACEMENT

Facing machine from front, start Carriage on Wayrod (11) from left side.
Hold down Margin Release Key.
Slide Carriage on – connect Drawband.
Position Tab Frame (4). (Replace shims as they were before).
Replace Screws (8) (4).

UNDERWOOD CARRIAGE ADJUSTMENTS



You have four points to consider, both left and right, when making a carriage adjustment. First – carriage clearance between rail and carriage frame at (6) and (7). Second – front rail adjustment at (4) and (5). Third – carriage clearance at point (7). Fourth – clearance of adjustment screw (12) and the carriage rail.

Check the wayrod (8) before starting to be sure it is perfectly straight. If it has a bow or bend in it, the carriage cannot be adjusted properly. Check all rolls (i.e. 1, 2, 11) to assure they are rolling freely. These rolls can get gumed up and bind the carriage.

The carriage must be free to move the complete distance left to right without the slightest bind. At the same time, you should have the least amount of play in the carriage.

Make the following adjustments with the draw-band *disconnected*:

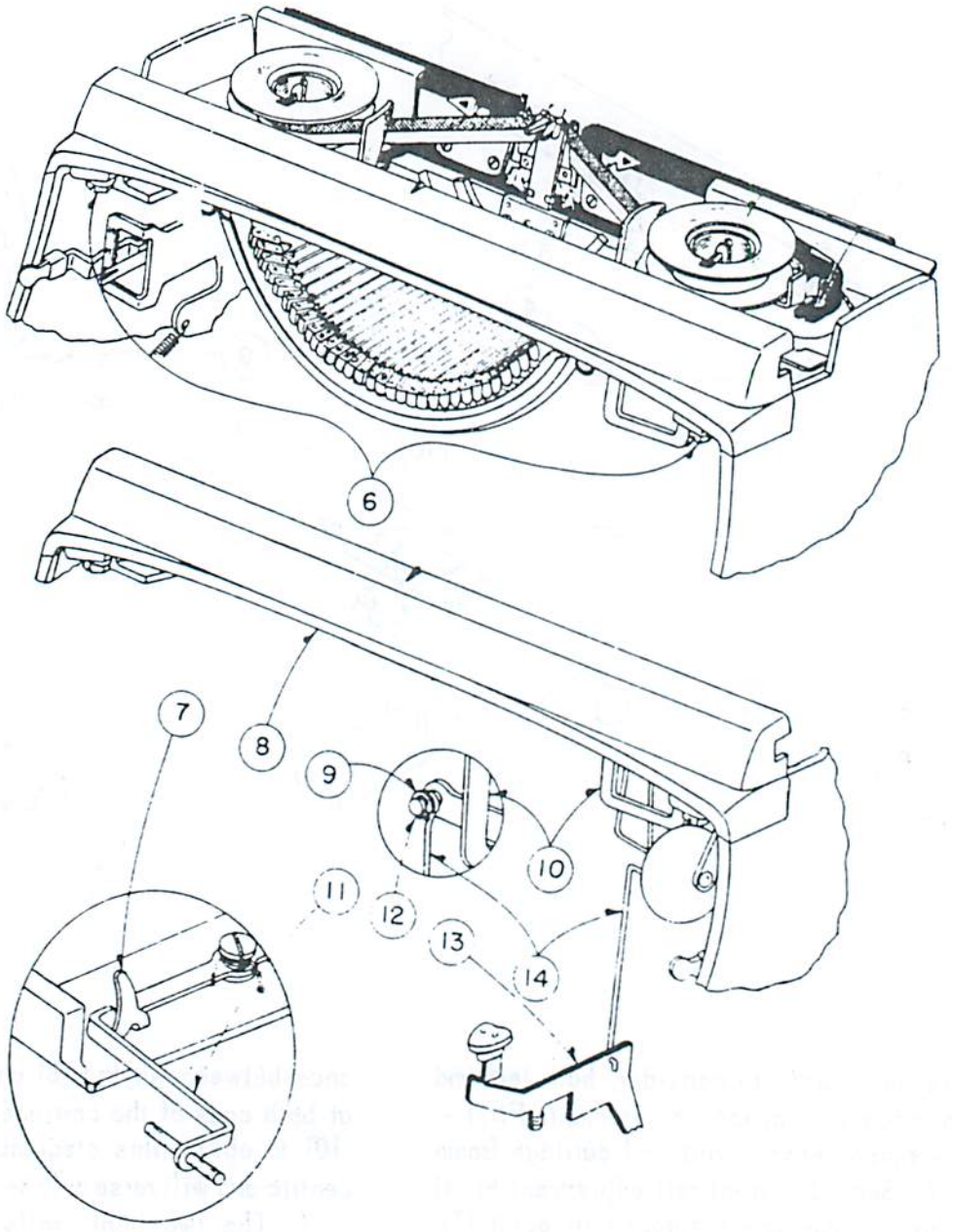
1. The carriage frame must have .025 inch clearance between wayrod (8) and point (6). Check this at both ends of the carriage. Adjust screws (9) and (10) to obtain this clearance. Rolls (11) are eccentric and will raise or lower the carriage as needed.

2. The two front rolls (1) and (2) should be positioned as at (4) and (5). The left roll should be rolling on the bottom of the rail, and the right roll should be rolling on top of the rail. The right roll is an eccentric adjustment. Loosen screw (3) and turn roller until the left roll is at the bottom and the right roll is at the top. Use caution! Do not get these rolls too tight against the rail as they will bind the carriage.

3. Adjust screws (7) (L and R) to have a minimum of clearance between screw (7) and wayrod (8). Check both sides of this adjustment.

4. Adjust screws (12) (L and R) to have a minimum of clearance between screw (12) and wayrod (8). Check both sides of this adjustment.

FRONT CARRIAGE RAIL — UNDERWOOD

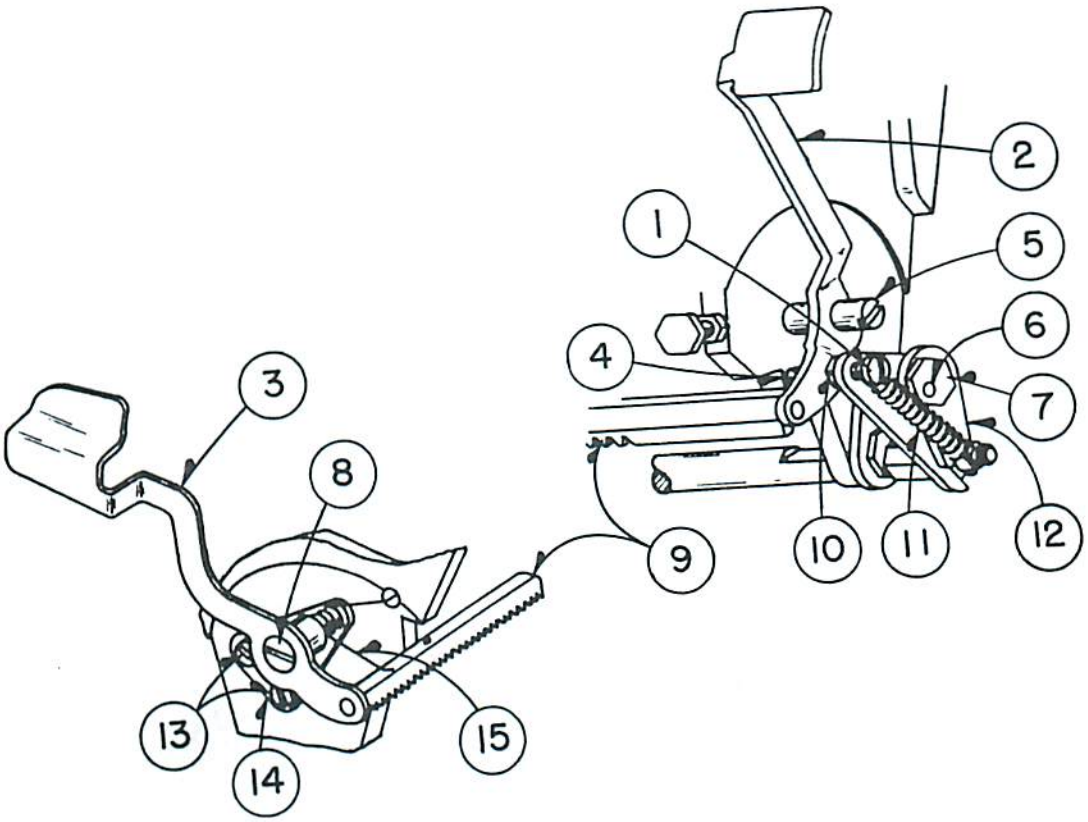


REMOVAL

Remove Carriage.
Remove Clip (9).
Remove Link (14).
Remove Screws (6) L & R.
Remove Carriage Rail (8).

REPLACEMENT

Position Carriage Rail (8). (Slide 11 to the left of Lever 7).
Connect Link (14) to Keylever (13).
Position Link (14) to right of Lever (10) on Stud (12).
Install Clip (9).
Install Screws (6) very snugly – make sure Front Carriage Rail (8) fits down tight against frame.



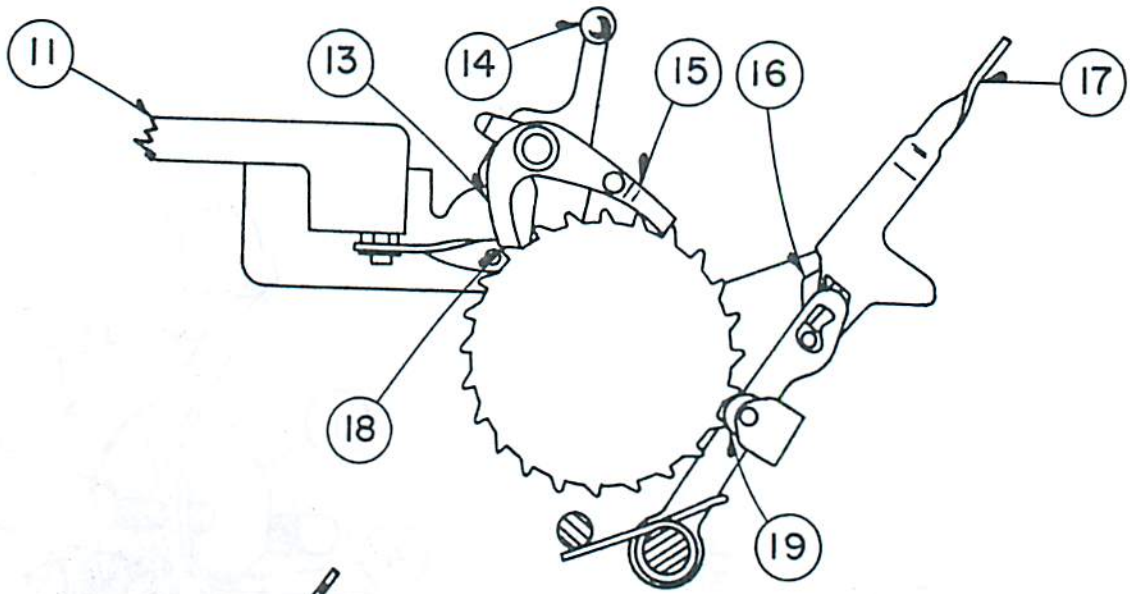
The Underwood Touchmaster No. 5 rack is free to be moved up and down, but, in addition, it has left to right movement. This is the result of the under and over banking adjustment of the machine. Some call it a floating rack.

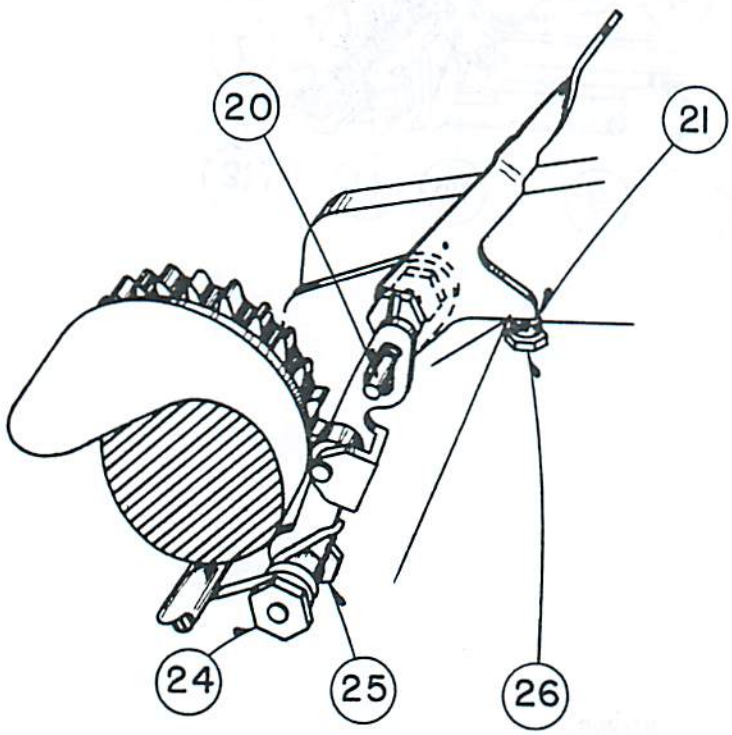
The carriage must first be in good adjustment before the rack adjustments can be properly performed. The rack must be free up and down and left and right (about 1/2 inch). Disconnect spring (15) and check the rack freedom. Check the tension of spring (15). If more tension is needed, form end of spring (15) down.

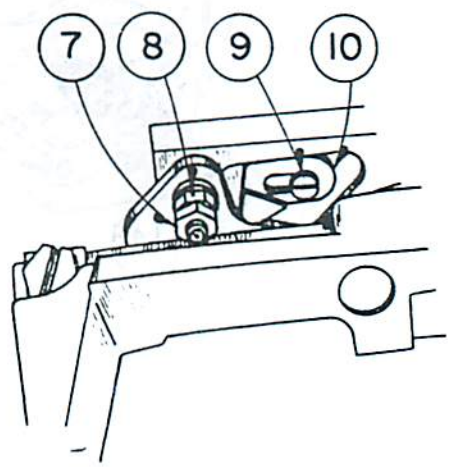
Adjust screw (1) in or out so that lever (2) contacts the inside shoulder of (5) at the same time *that the end* of screw (1) contacts the frame of the carriage.

The rack must be parallel. Adjust plate (14) at the right end of the carriage up or down to level the rack at the same height at the left as it is at the right. Plate (14) should also be adjusted so that the distance from the starwheel to the rack is the same when the carriage is moved left to right.

The rack must mesh in the pinion gear as deeply as possible without actually bottoming in the pinion. Adjust eccentric (6) to raise or lower the rack. If the rack is adjusted too high, the carriage will jump out of mesh and skip when the *slightest* pressure is applied to the carriage. Finally, recheck the rack for freedom of movement up and down.







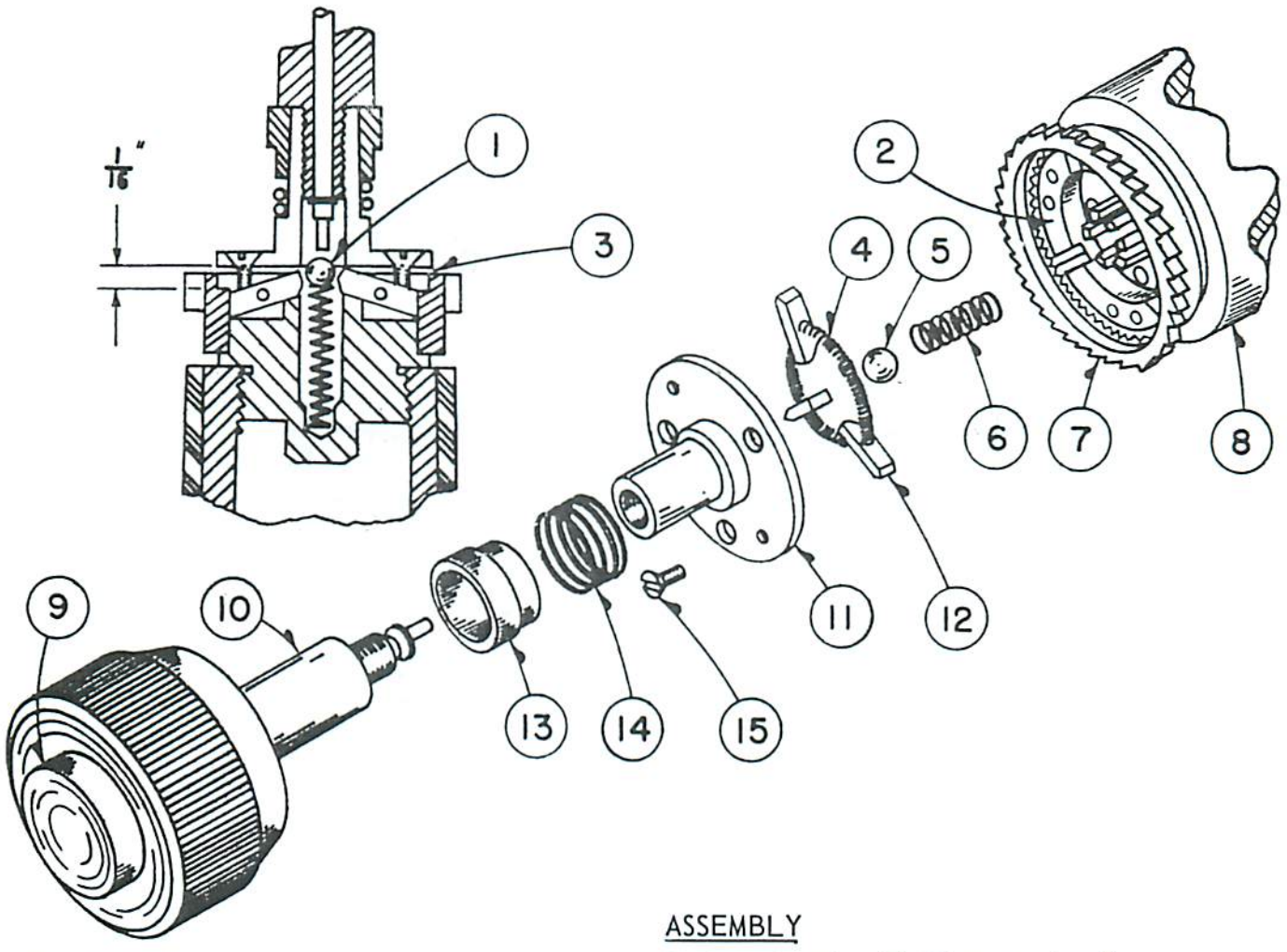
The line space lever should space either 1, 2, or 3 spaces as set on the selector lever. The line space lever should operate freely. The coil spring should have enough tension to return the lever with a snappy action.

With the selector lever set for one space, pull the line space lever IN as far as possible. Check point (18) that the heel of the pawl (15) is in the notch. Also roll (19) should be located in the ratchet tooth, as shown. Limit screw (9) should be just contacting the carriage frame.

Check that the platen is free. Check the condition of roll (19). Check pawl (15) that it is not loose on its pivot.

ADJUSTMENT:

1. Adjust eccentric (25) to position roll (19) forward or rearward.
2. Adjust set screw (9) for limit of lever (11).



DISASSEMBLY

Remove left Platen Knob. (Left hand thread).
Remove Bushing (13).
Remove Spring (14).
Remove (3) screws (15).
Remove Flange (11).

NOTE: WATCH FOR BALL BEARING (5).

Remove Blades (12) and Spring (4).
Remove Spring (6).
Remove Ratchet (7).

ASSEMBLY

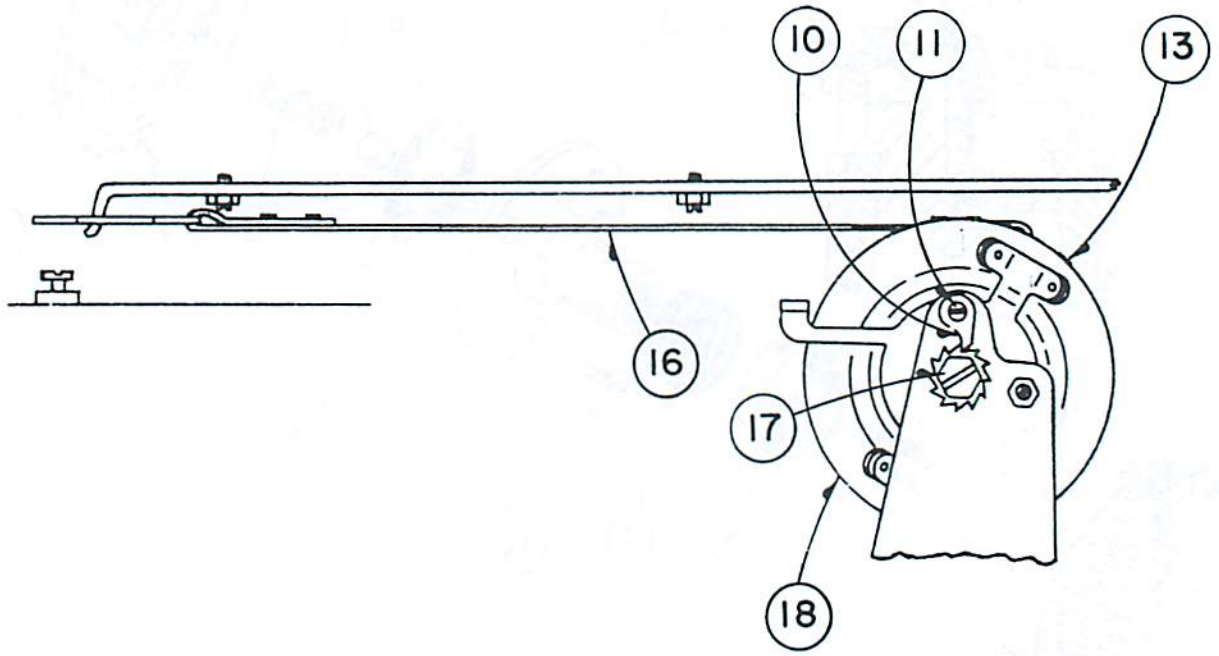
Replace Ratchet (7) (Flange side in).
Replace Spring (6).
Replace Blades (12) and Spring (4) (Bevel facing in).

NOTE: HOLD (3) BLADES (12) DOWN AND REPLACE FLANGE (11).

Replace Screws (15) only enough to hold Flange in place, as at (3).
Replace Ball Bearing in hole.
Replace Spring (14).
Replace Bushing (13).
Replace Left Platen Knob (Do not tighten).

NOTE: WHILE HOLDING PLATEN UPRIGHT, STRIKE RELEASE KNOB (9) A SHARP BLOW WITH THE PALM OF YOUR HAND TO SEAT THE BALL BEARING.

Tighten (3) Screws (15).
Tighten Left Platen Knob.



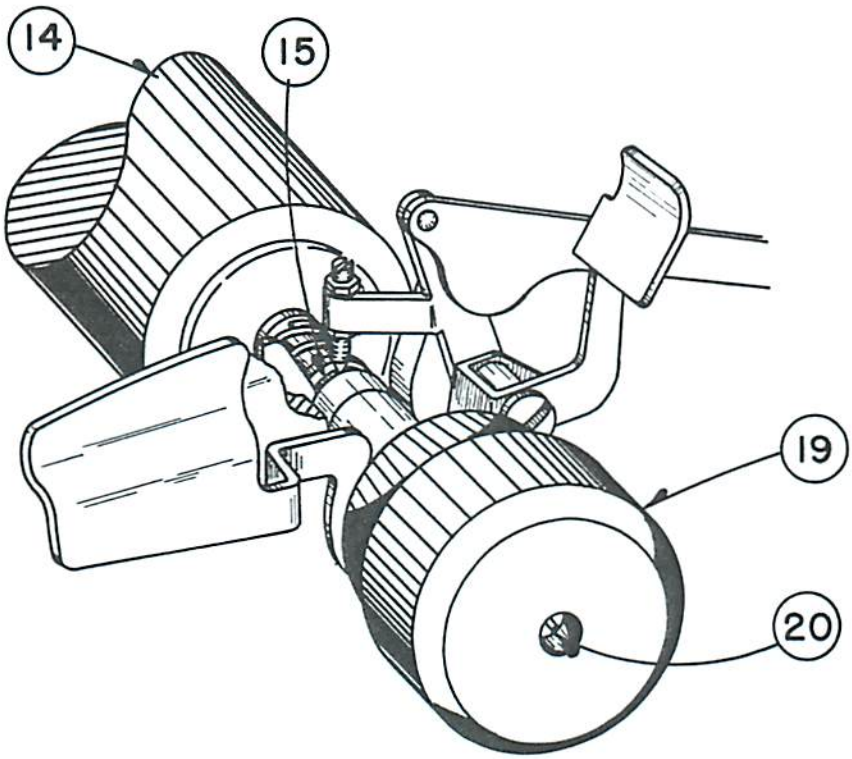
The drawband tension should be adequate to move the carriage, using the space bar, to the left with a snappy action. The factory standard adjustment for an 11" carriage is 27 ounces of pull to return the carriage from the extreme left position to the extreme right.

Check the drawband first. It must be in good condition – not twisted.

To increase the drawband tension, hold pawl (10) engaged with the ratchet. Do not let the pawl get out of engagement. Loosen screw (11) slightly. Hold pawl in ratchet. Turn screw (17) clockwise. Hold pawl in ratchet. When desired tension is obtained, hold pawl in ratchet and tighten screw (11). Now, and only now, release pawl.

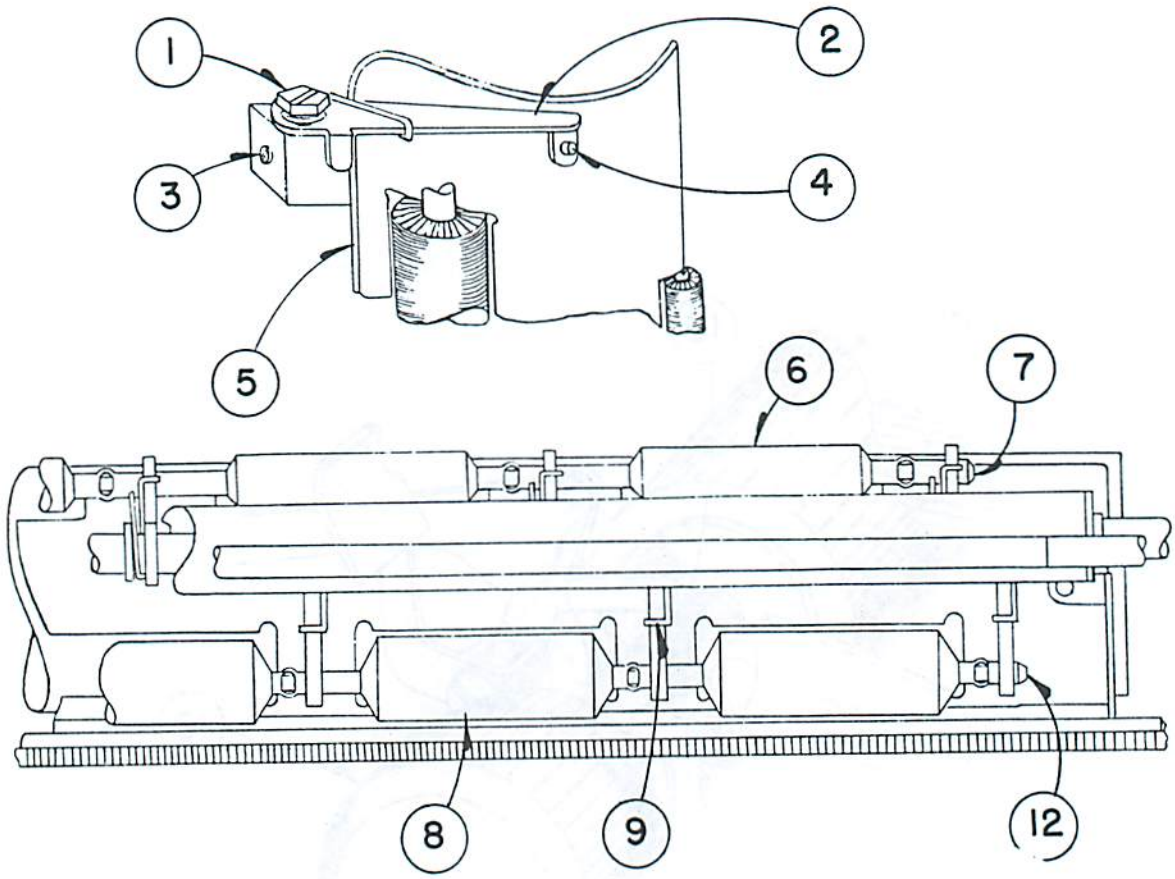
To decrease drawband tension, hold spring drum (13) and disconnect the drawband at (13). *Carefully* allow the spring drum to unwind about two revolutions. Connect drawband.

CAUTION: While drawband is disconnected at (13), do not let this drawband become disconnected at the other end.



The platen must rest snugly in the carriage shell, yet rotate freely when the paper release lever is forward and when the ratchet detent lever is forward. Adjust lock nut at (15) to prevent an up and down movement of the platen.

The end play of a platen is adjusted by loosening the right hand platen knob (19) (turning counterclockwise) and adjusting screw (20) in or out. Then tighten the platen knob. (Turn clockwise).



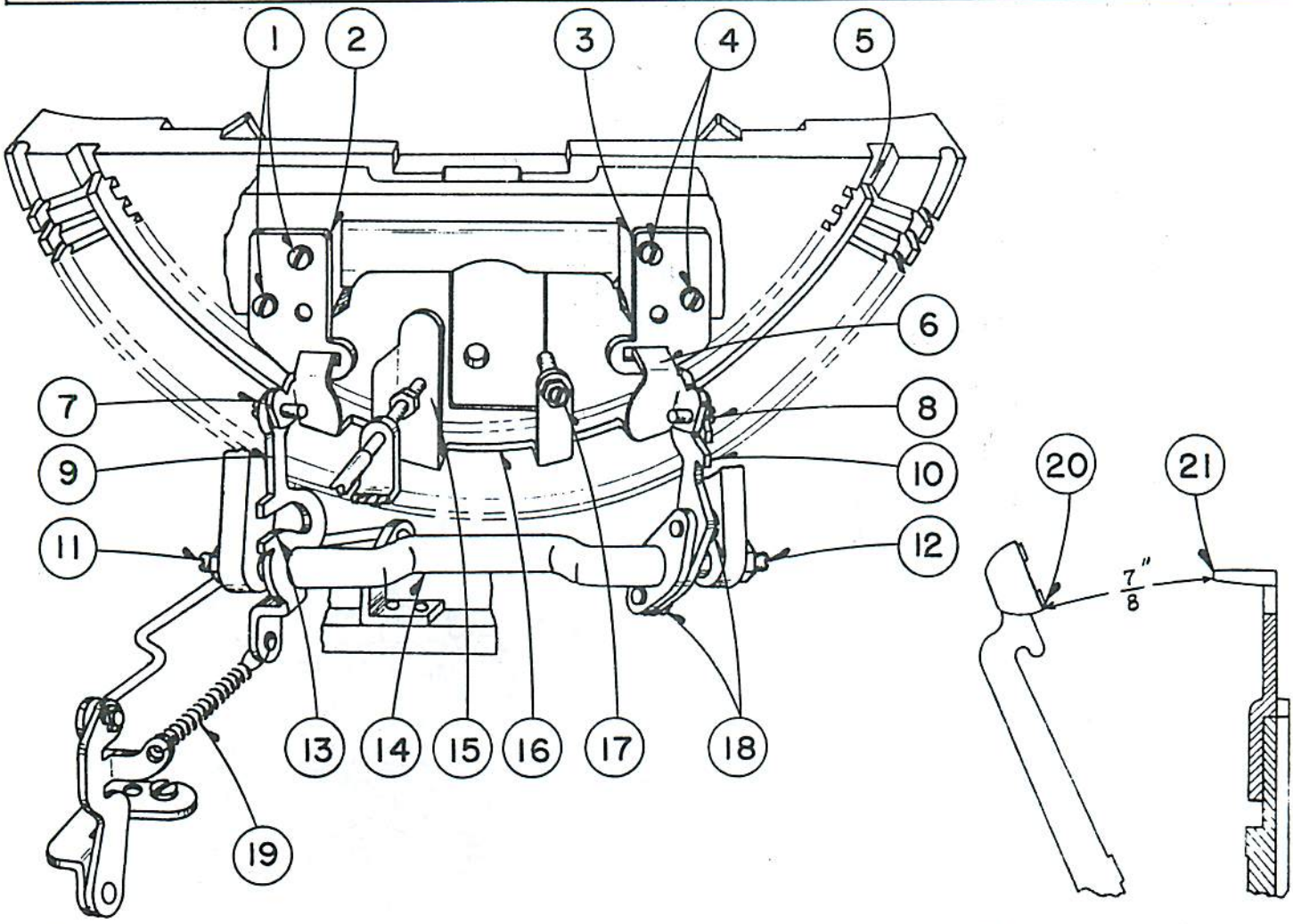
The feed rolls must line up with paper pan (5). They must have equal clearance, both front and rear, in the paper pan (5) slots. Adjust eccentric screw (1) to get proper clearance front to rear – form arm (2) for left to right clearance.

The feed roll (6) and (8) must be free on the feed roll shaft (7) and (12). Check that they turn freely. If they will not, remove the feed rolls from the shaft, clean shaft, and replace the feed rolls with new ones.

The shaft (7) and (12) should not have more than .010 inch end play. Adjust by opening or closing the slots in the feed roll shaft spacers.

With the platen in the machine and the feed roll release lever pulled forward, there should be about .060 to .070 inch clearance of the feed rolls and the platen. To check this, insert about 15 sheets of paper into the typewriter and pull the release lever forward. The sheets of paper should be free to move left to right – up or down. Adjust by forming arms (9) up or down as needed. CAUTION: DO NOT FORM TOO MUCH ON THESE AS THEY MAY BREAK.

The feed rolls must have good grip on one sheet of paper. Check this with a strip of paper about one inch wide. Insert this paper on the right rear feed roll and pull out slowly. There should be good drag. Repeat this at the left side of the rear feed roll. Now check the front feed rolls at the left, center, and also the right side of the platen. To adjust, form brackets (9) up or down.



The U bar of the Underwood is located behind the segment. The U bar must be free at each point. Arms (9) and (10) may be formed if needed to loosen and free the U bar.

The U bar must be positioned in the center of the slot in the segment. Check this at both ends of the slot. Adjust with screws (11) and (12) to move the U bar left or right – thus centering it. Check for freedom of the U bar.

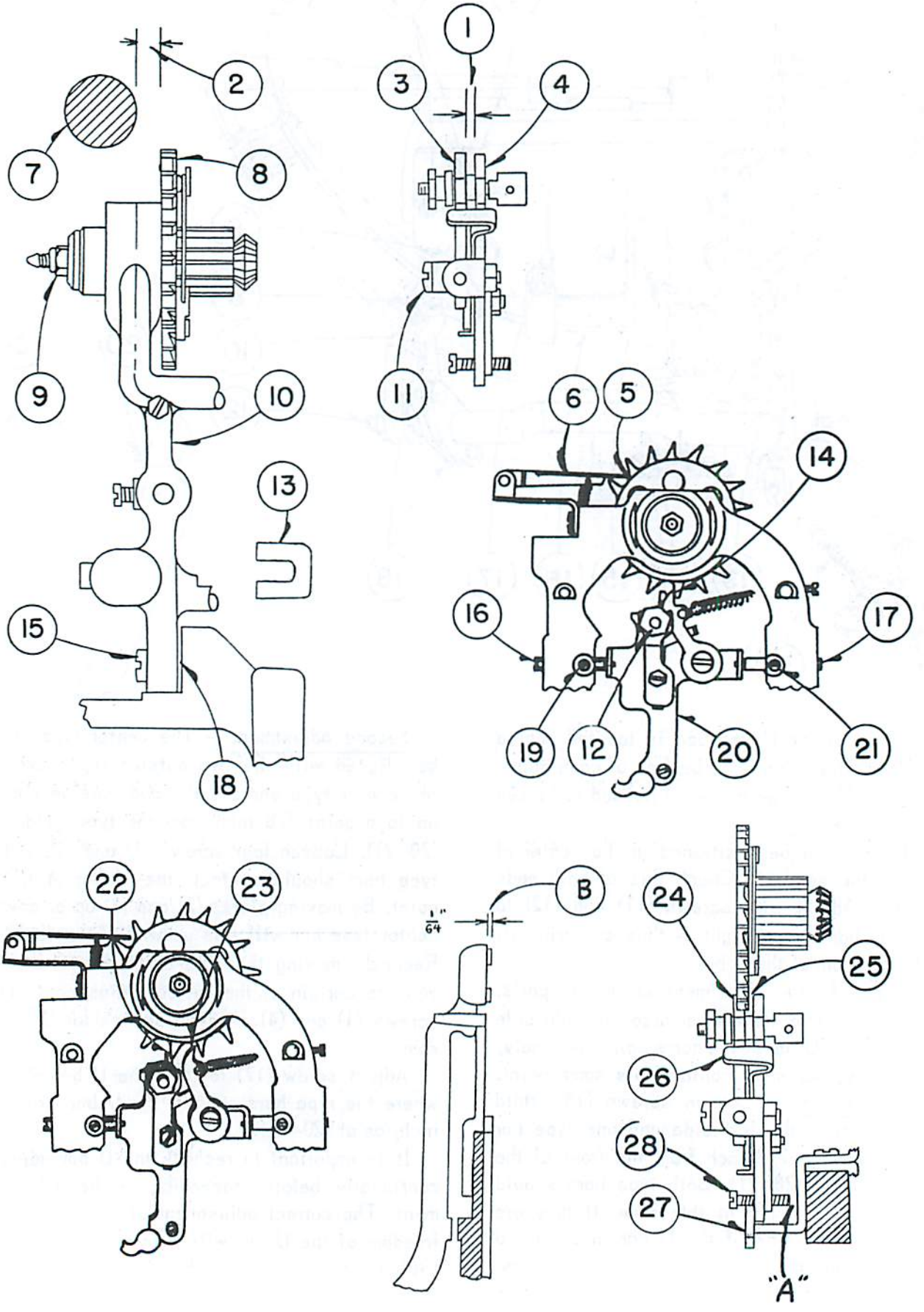
The actual U bar adjustment is in two parts. First, type bars from the left and also the right side must contact the U bar at the same point. Secondly, the center type bar must contact this same point.

First adjustment – Loosen screws (18). Hold one type bar from the left side and one type bar from the right side 7/8 inch from the front of the type guide, as at (20–21). Both type bars should be contacting the U bar at this time. If they are not, move the left side of the U bar in or out to achieve this condition. Recheck this several times, then tighten screws (18). Again, recheck freedom of U bar.

Second adjustment – The center type bar must be aligned with the two outside type bars. Bring the center type bar and the two outside type bars up to a point 7/8 inch from the type guide, as at (20–21). Loosen four screws (1) and (4). All three type bars should contact the U bar at the same point. By moving plates (2) and (3) up or down, the center type bar will line up with the outside ones. Recheck, moving the type bars up and down until you are certain of the correct adjustment. Tighten screws (1) and (4). Again, recheck for U bar freedom.

Adjust screw (17) to limit the U bar at a point where the type bars contact the U bar exactly 7/8 inch, as at (20–21).

It is important to recheck the U bar adjustment continually before proceeding to the next adjustment. The correct adjustment of the U bar and the freedom of the U bar will determine the individual trip adjustment of the machine.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B
1/64"
"A"

There must be 3/8 inch clearance between rod (7) and the back of starwheel (8), as at (2). To adjust for more or less clearance, place shims (13) behind bracket (10), as at (18). Check to be sure screws (15) are tight before this adjustment.

The left to right distance between the loose dog and the rigid dog must be from .030 to .036, as at (1). To adjust, remove loose dog and form it either frontward or rearward. When replacing loose dog, check that it does not bind after you have formed it.

To position the rocker at the 6:00 O'clock position, loosen screws (19) and (21). Turn screw (16) in or out until the face of the loose dog is flush with the face of the starwheel tooth, as at (14). After making this adjustment, check again that the rocker does not have end play and is very free.

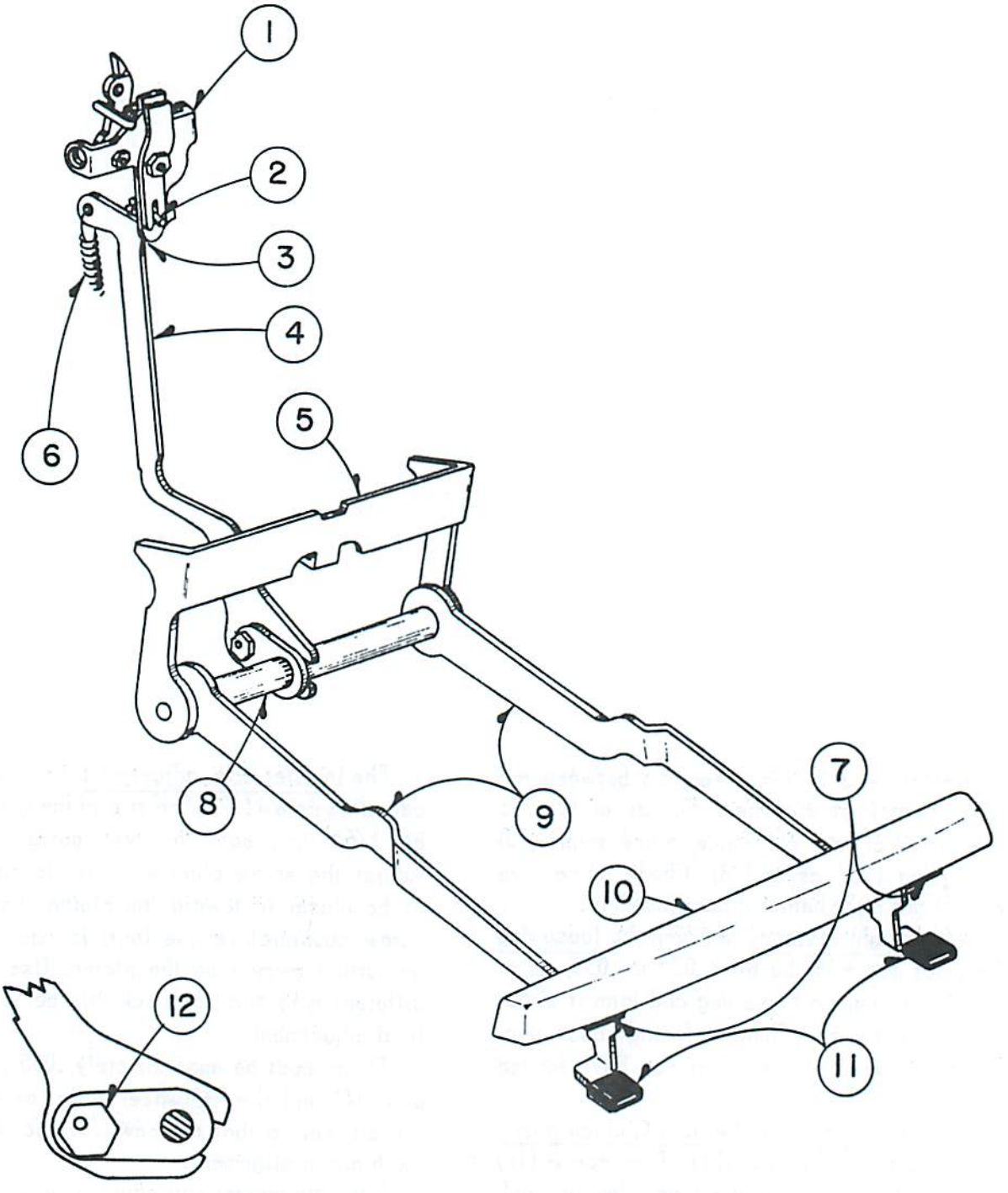
The front limit adjustment is made by forming limit plate (27) either to the back or to the front. The loose dog must be positioned .010 behind the front edge of the starwheel tooth, as at (25).

The master trip adjustment is made with the adjusting screw (12). The trip of the type bar should be 1/64 inch past the type guide, as at "B". Adjust the screw clockwise (in) to cause the trip to be closer in toward the platen, and adjust the screw counterclockwise (out) to cause the trip to be farther away from the platen. Use a number of different type bars to check this before making the final adjustment.

There must be approximately .005 play between pawl (6) and the starwheel tooth, as at (5). Form the bracket so that the pawl (6) and the starwheel tooth are in alignment.

After the master trip adjustment has been made, adjust screw (28) in or out to adjust the back limit. There should be about .005 to .010 play, as at "A", when a type bar is held against the platen.

Recheck your work. All parts must be free; such as, the starwheel, the pinion, the rocker, and the loose dog. All type bars must also be free.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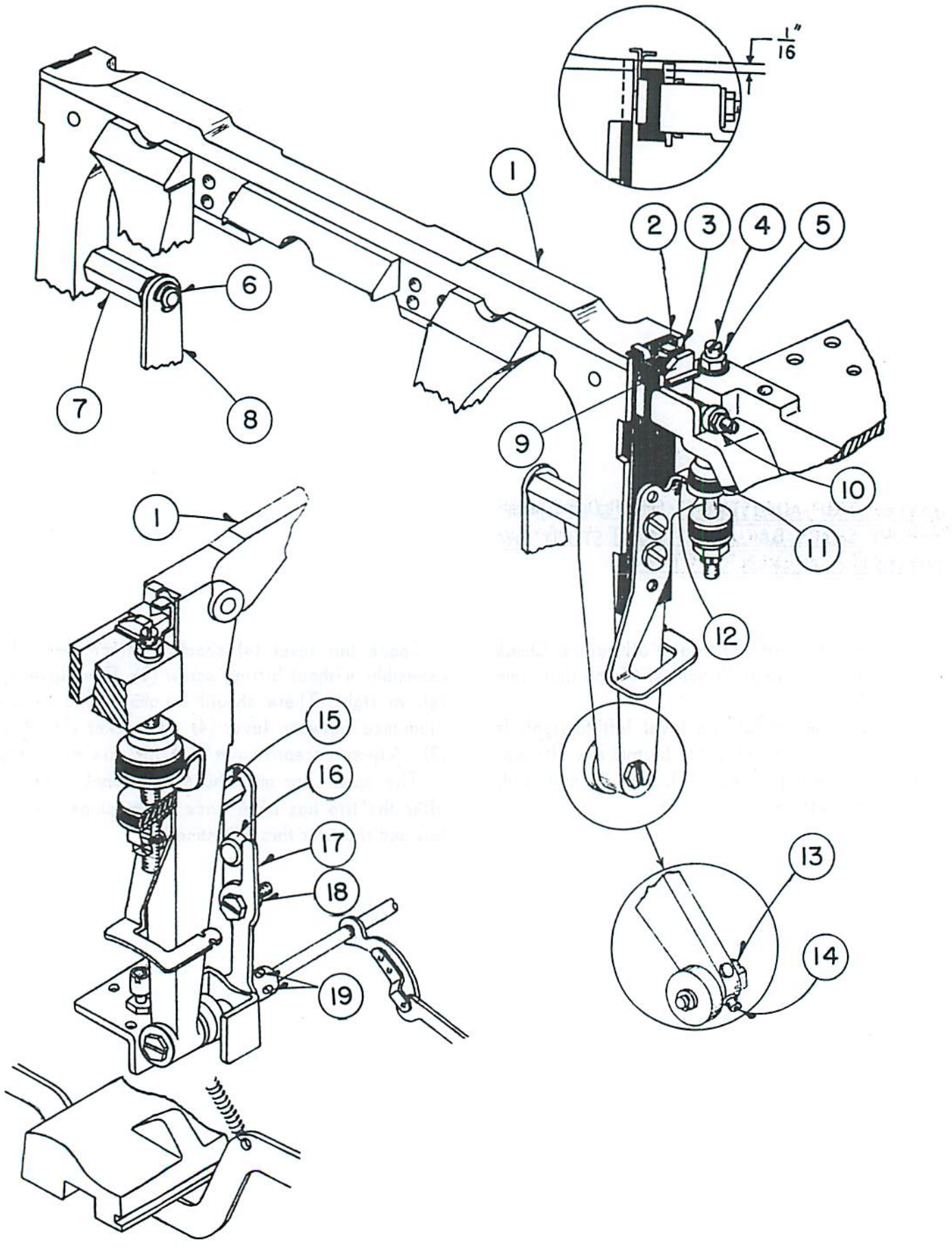
MASTER TRIP ADJUSTMENT SHOULD BE MADE BEFORE SPACE BAR ADJUSTMENT. STUDY UNERWOOD ESCAPEMENT SECTION.

The space bar must be free at all points. Check shaft (8) between the pivot points. Check that arms (9) are free.

The space bar should be level left to right. It should rest 3/8 inch below the bottom row of keys. Adjust by forming stops (11). Check that both stops contact with equal pressure.

Space bar lever (4) should contact the rocker assembly without hitting screw (2). Form lever (4) left or right. There should be about .010 to .020 clearance between lever (4) and rocker (1), as at (3). Adjust eccentric nut (12) for this clearance.

The space bar must have additional movement after the trip has been made. Form stops (7) both left and right for this adjustment.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The segment of the Underwood presents one of the most important adjustments of the machine. This adjustment positions this segment in a permanent position enabling you to adjust the "on feet", ring and cylinder, and motion. This adjustment must be made first before others are attempted.

The segment must be free of binds, but it also must be snug. To check this, remove clips (6) both left and right. Remove arms (8) (L & R) from stud (7). The segment should be free to move up and down. To remove end play in the segment, loosen lock nut (10) and move wedge (9) up or down as needed. To remove the front to rear movement of the segment, loosen set screw (14) and turn eccentric nut (13).

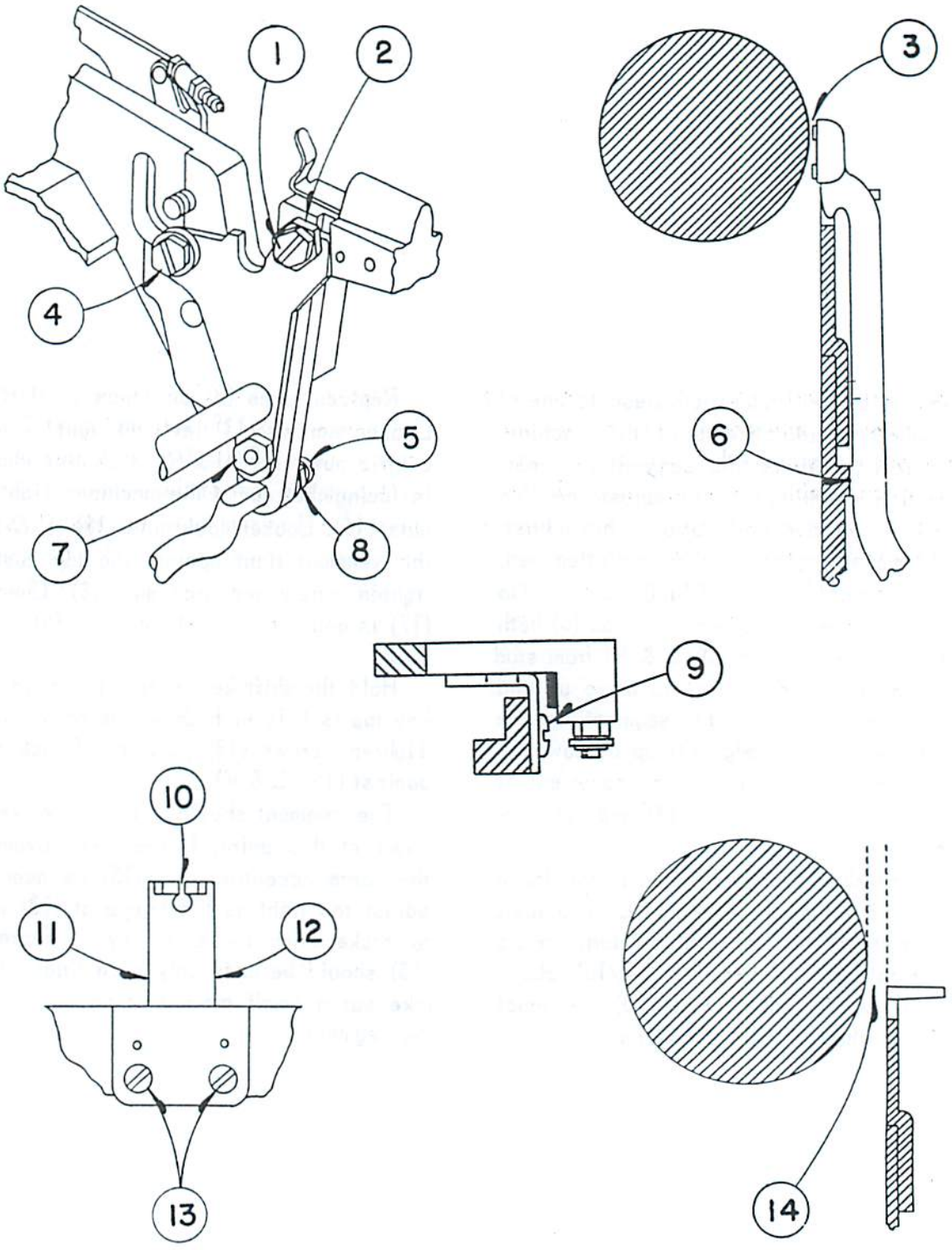
The segment should be positioned in the frame 1/16" above the outer rail (See inset). To adjust, loosen lock nuts (5) left and right and turn screws (4) left and right until the segment is 1/16" above the outer rail. Check that cushion (10) has equal pressure on both the left and right sides.

Replace arms (8) on studs (7) left and right. Loosen screws (13) left and right. Turn large eccentric nuts (15) (L & R) to a point where the nick is facing the rear of the machine. Tighten the lock nuts (15). Loosen lock nuts (18) (L & R). Holding the segment tight against the top cushion stops, tighten screw and lock nut (18). Check that arm (17) is against the cushion stop (16), both left and right.

Hold the shift key up to a point where the shift key top is 1/16 inch above the bottom row of keys. Tighten screws (13) (L & R). Check that (17) is against (16) (L & R).

The segment should not have movement up or down at this point. If there is movement, adjust the large eccentric nuts (15) as needed. Do not adjust too tight as the toggle at (12) will be hard to brake when the shift key is depressed. Nuts (15) should be used only as a final adjustment to take out a small amount of up and down play in the segment.

RING & CYLINDER - ON FEET UNDERWOOD



UNDERWOOD RING & CYLINDER - ON FEET

IMPORTANT: STUDY INFORMATION ON RING AND CYLINDER AND ON FEET IN THE GENERAL INFORMATION SECTION FIRST FOR DEFINITIONS.

The Underwood typewriter has a fixed adjustment for the segment in the small letter position – 1/16 inch. (See Segment Section.) Therefore the ring and cylinder and "on feet" adjustments coinside. These are actually two separate adjustments, but in this case it is suggested that both adjustments be made at the same time.

The carriage and the segment must be in good adjustment. Check both of these before beginning ring and cylinder adjustment.

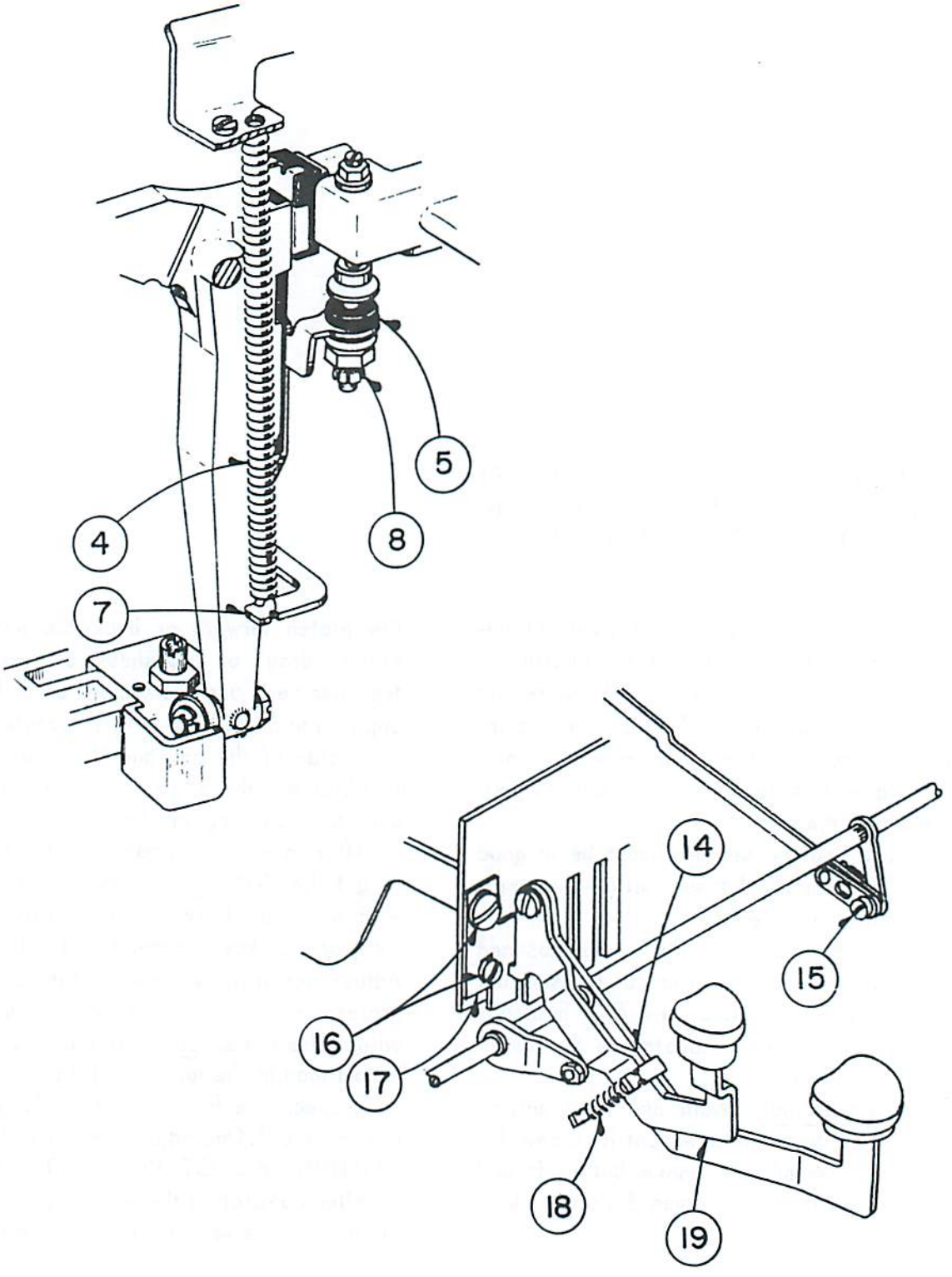
There are nine screws or nuts to be loosened before any adjustments can be made. Loosen, just "snug tight", screws (1, 4, 5, and 7) – both left and right. Loosen screw (9), located on the inside of the line space lever.

The ring and cylinder (front and rear) adjustment is obtained by turning eccentric screw (2) left and right. Remember to move both left and right sides of the platen the same distance. Move the platen forward or backward until there is a slight "drag" on two sheets of paper between the type bar head and the platen, as at (3). Check the paper drag on the left – at the center – and on the right side of the carriage. If a slight drag cannot be obtained, the segment is out and must be re-adjusted. (See Segment Section.)

After completing a good R & C, the next step is to get the "ON FEET" adjustment. This is done with the small letters. Type lightly with the "h", "k", or "½" key in order to get a light impression. Adjust eccentric screws (8) left and right. If the impressions are darker on the top than at the bottom, adjust the platen down. If they are darker on the bottom than at the top, adjust the platen up.

Recheck the R & C continually when adjusting the "on feet". One adjustment will affect the other. CAUTION: ADJUST BOTH SIDES OF PLATEN.

After completing the R & C and the "On feet", tighten all screws that were loosened.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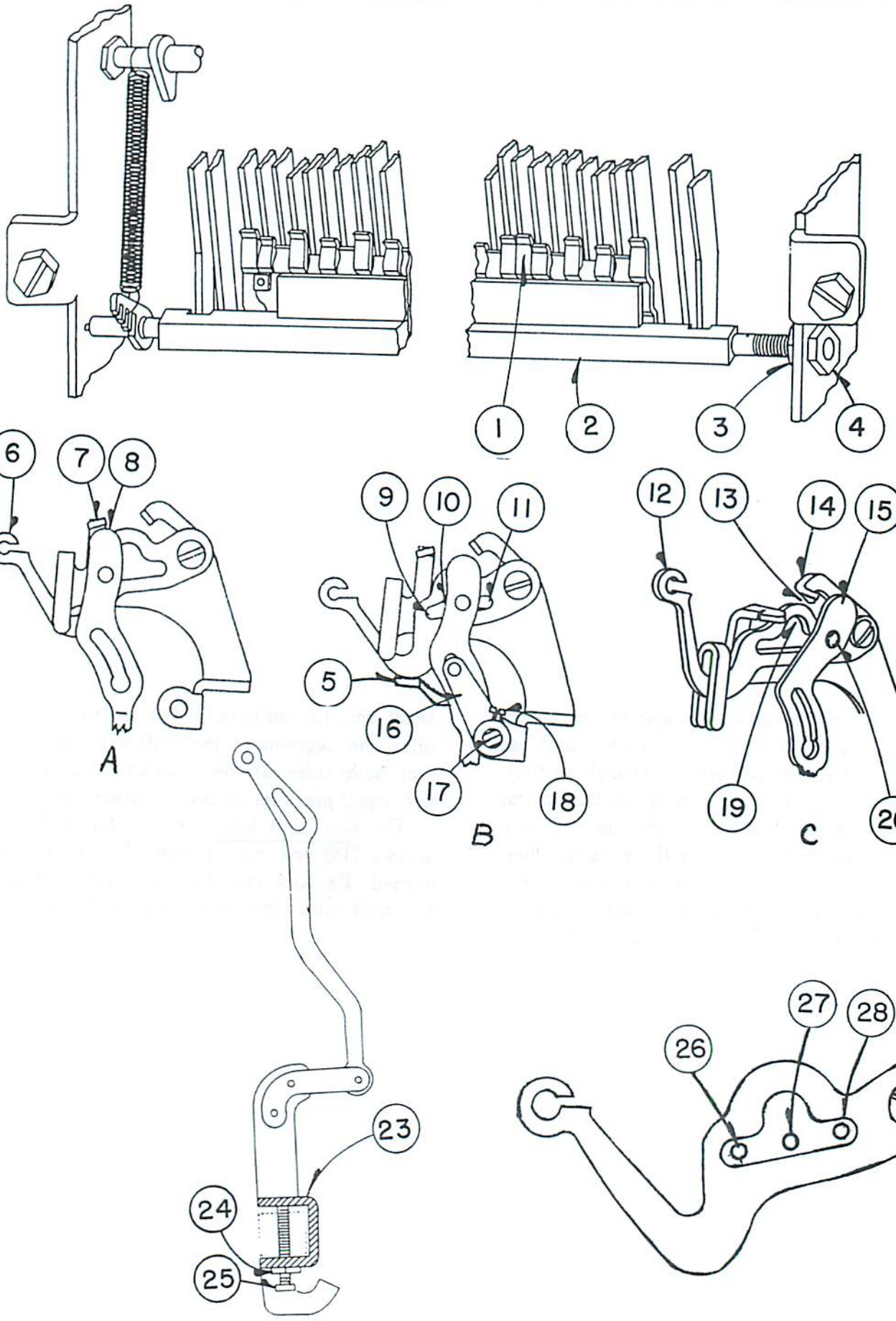
Before the motion of the Underwood can be adjusted, the segment, ring and cylinder and "on feet adjustments must be perfect. Make these first.

The motion is adjusted by aligning the capital letters with the small letters. ("On feet") Type a number of capital letters and small letters together. If the capital is higher than the small one, loosen nuts (8) both left and right. This will lower the segment. If the capital letter is lower than the small one, tighten nuts (8) left and right. This will raise the segment in the shifted position. Check that both sides of the segment arms are resting with equal pressure on cushion stops (5).

The shift lock keys are adjusted by loosening screws (16) and moving plate (17) up or down as needed. Be sure that the shift keys will release the shift locks. Recheck the plate 17 adjustment.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The Underwood bichrome gets its throw from the universal bar. This bar is located beneath the key levers. As a key lever is depressed, the universal bar is pivoted, thus activating the ribbon vibrator up to a certain point.

Step 1 – Rest Position. When a bichrome lever is in the stencil position (center), the ribbon vibrator should be resting on the arm, as at (5). The top of the ribbon should be about .015 – .025 above the type guide. Check this by shifting the segment to the capital position and depressing the underscore key. This key should not make an impression on the paper with the bichrome lever in the stencil position. Adjust by forming arm (5) up or down as needed.

Step 2 – Universal Bar. The universal bar should be free of binds with as little end shake as possible . Adjust with lock nuts (4) and screw (3). All prongs (1) on the universal bar should clear the key levers by about .003, except the period prong. This prong should be resting on the key lever. Form prong (1) (period key) to get this clearance.

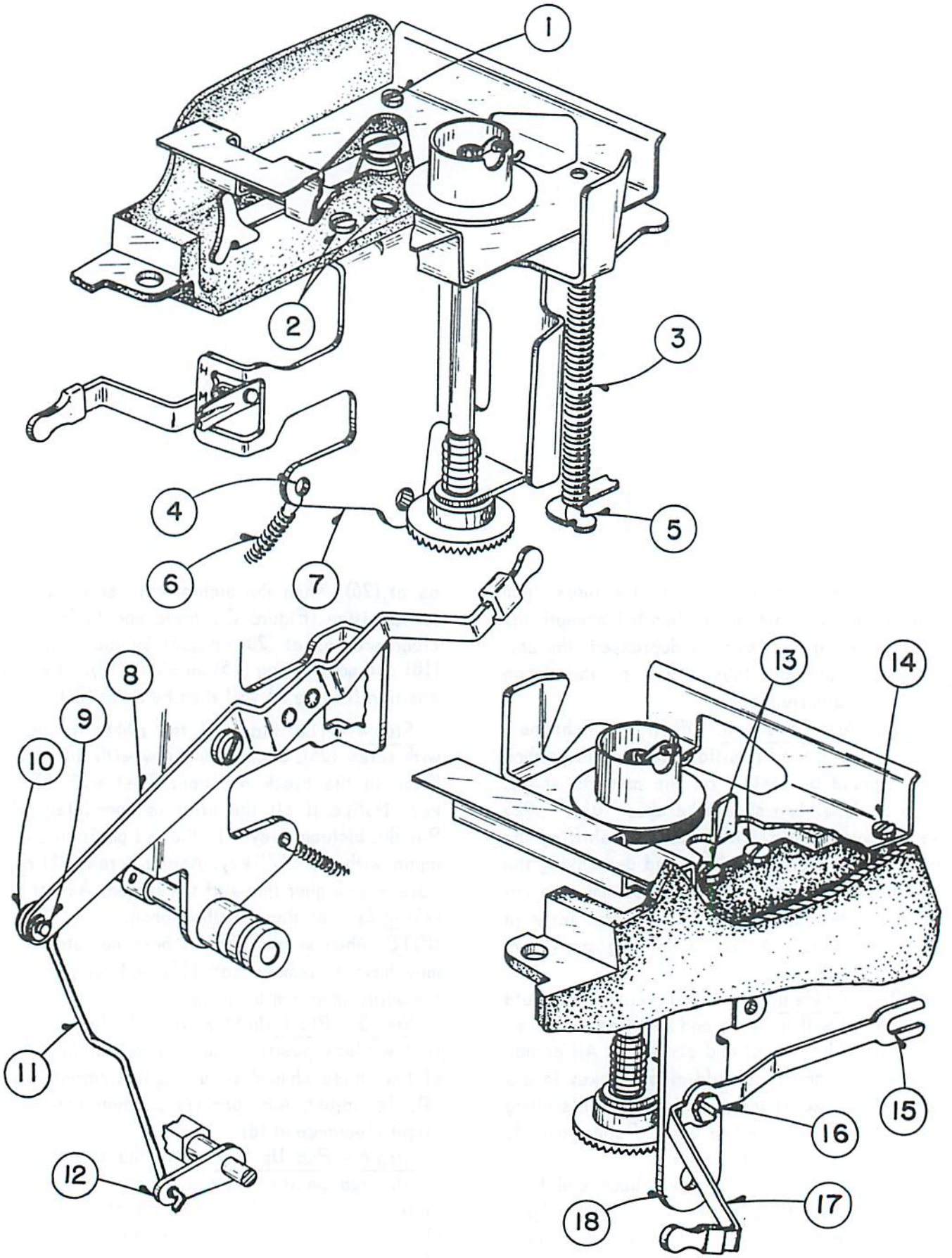
Step 3 – Stud (20) should move back and forth in slot (19) without contacting any of the edges. When the bichrome lever is set in the black position (Figure A), there should be a slight clearance as at (26). When the bichrome lever is set in the red position (Figure C), there should be a slight clearance, as at (28). Adjust by loosening screw (18) and positioning (16) on shaft (17). The stencil position (Figure B) will then be as at (27).

Step 4 – The throw of the ribbon is adjusted with screw (25). Check the throw with the bichrome lever in the black position. Test with the "½" key. Notice if all the print is completely black. Put the bichrome lever in the red position and test again with the "½" key. Adjust screw (25) out for more – or higher throw of the ribbon. Adjust screw (25) in for less throw of the ribbon.

NOTE: When screw (25) has been adjusted in, you may have to remove part (23) and form it so that the adjustment can be made.

Step 5 – Black Up Stop. With the bichrome lever in the black position and a type bar held to the platen, there should be a slight clearance, as at (8). To adjust, form arm (7) so that there is that slight clearance at (8).

Step 6 – Red Up Stop. With the bichrome lever in the red position and a type bar held to the platen, there should be a slight clearance, as at (13). To adjust, form arm (14) for this clearance at (13).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REMOVAL

Disconnect left Spring (3) at (5).
Disconnect Spring (6) at (4).
Remove Clip (9).
Disconnect Arm (8) from Link (11).
Remove Screw (1).
Remove Screws (2). (2)
Remove Left Ribbon Spool Shaft.

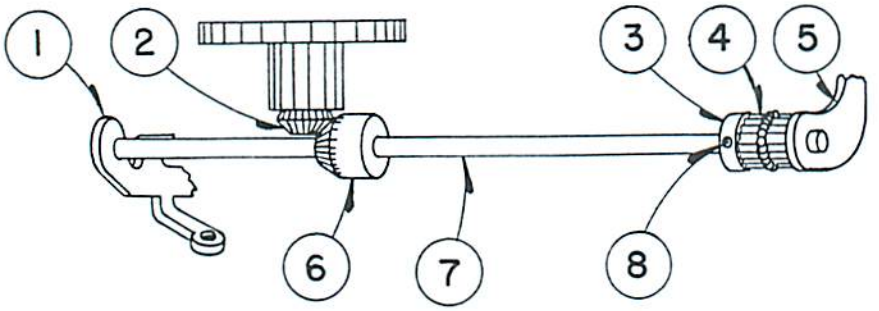
Remove Screw (16).
Remove Arm (17).
Disconnect right Spring (3) at (5).
Remove Screw (14).
Remove Screws (13). (2)
Remove Right Ribbon Spool Shaft.

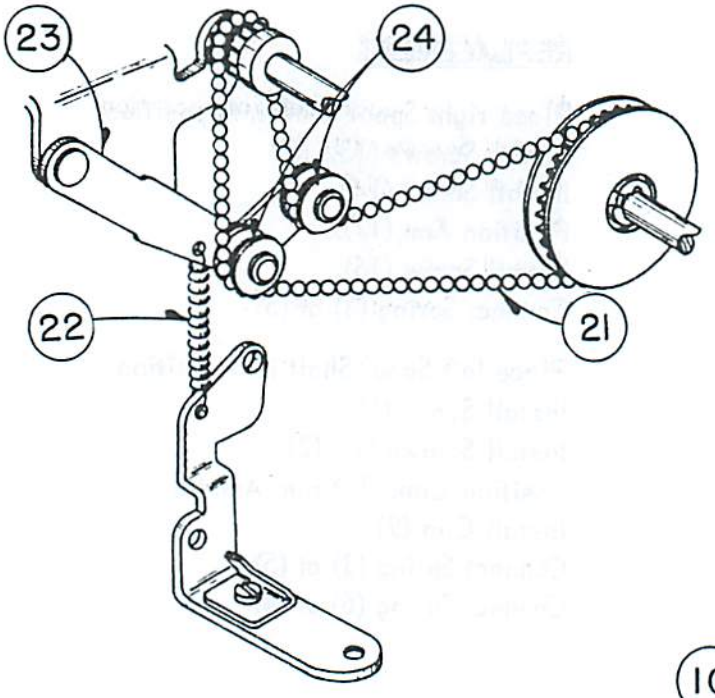
REPLACEMENT

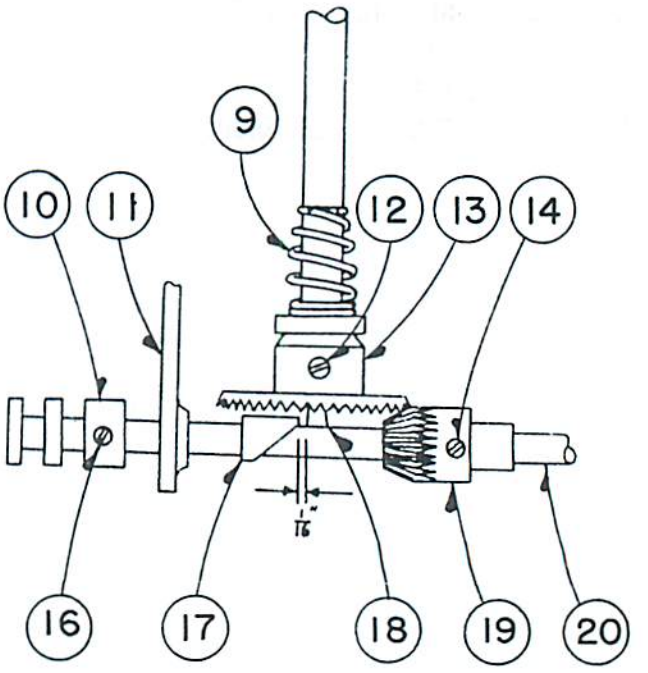
Place right Spool Shaft into position.
Install Screws (13). (2)
Install Screw (14).
Position Arm (17).
Install Screw (16).
Connect Spring (3) at (5).

Place left Spool Shaft into position.
Install Screw (1).
Install Screws (2). (2)
Position Link (11) into Arm (8).
Install Clip (9).
Connect Spring (3) at (5).
Connect Spring (6) at (4).

RIBBON FEED AND REVERSE UNDERWOOD







UNDERWOOD RIBBON FEED AND REVERSE

The ribbon feed is driven by the small pinion gear (2). This gear is on the front of the starwheel shaft. As the starwheel is rotated, the ribbon drive mechanism is activated through shaft (7), gear (4), chain (21), to the main drive shaft (20). Shaft (20) rotates gear (19) and is in mesh with gear (13) on either the left or the right side. This rotates the ribbon spool shaft which winds the ribbon.

All gears must mesh as deeply as possible without actually bottoming in the other gears. To adjust the mesh of gears (2) and (6), form bracket (1) left or right. CAUTION: This shaft must turn freely but not have too much end play in the shaft.

Drive chain (21) should be tight at all times. Spring (22) should have sufficient tension to keep the idler pulleys snug against the chain. Shaft (20) must be free to rotate without binding. Both left and right ribbon spool shafts must be free. Reverse plungers (18) must operate up and down freely.

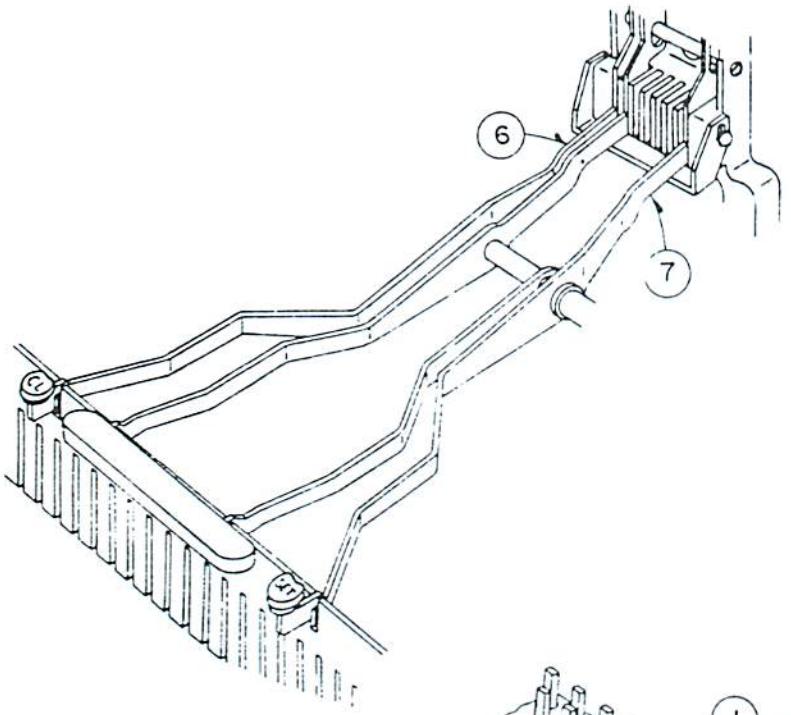
When the high side of reverse cam (17) is UP on the left, the high side of reverse cam (17) should be DOWN on the right side. Remove the ribbon from the left spool. Loosen screws (14) and (16). Move shaft (20) until there is 1/16" between the high point of cam (17) and plunger (18) as shown.

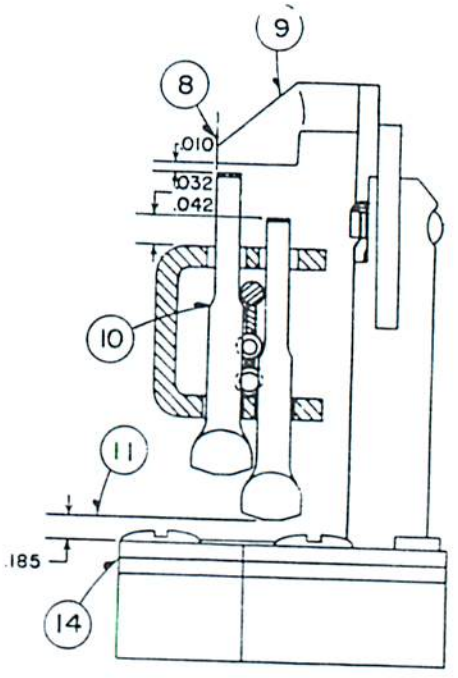
Adjust detent collar (10) at this position. Tighten screw (16). Adjust gear (19) into mesh with gear (13), making sure the 1/16" between the plunger and cam is retained. Tighten screw (14).

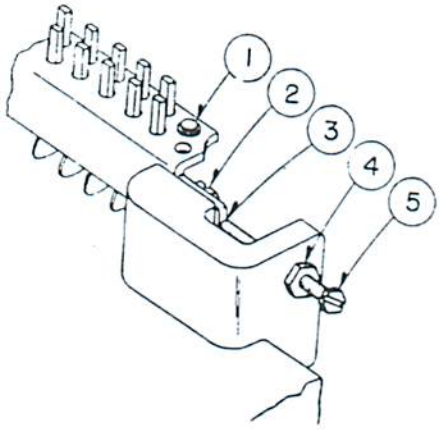
Replace the ribbon on the left spool and remove the right ribbon. Rotate shaft 20 one-half turn. Shift shaft (20) to the right. The reverse plunger should be 1/16" from the high point of the cam. If it is not, loosen screws (2) and (3), and move the bracket until there is 1/16" between the cam and plunger. Adjust the right side of gear (19) into mesh with gear (13). Do not readjust (10).

Recheck both sides of the ribbon reverses.

TABULATOR SET AND CLEAR UNDERWOOD







There are four steps to follow in adjusting the tabulator set and clear keys. These adjustments should be done in sequence. Check that all springs are connected and all parts are free of binds.

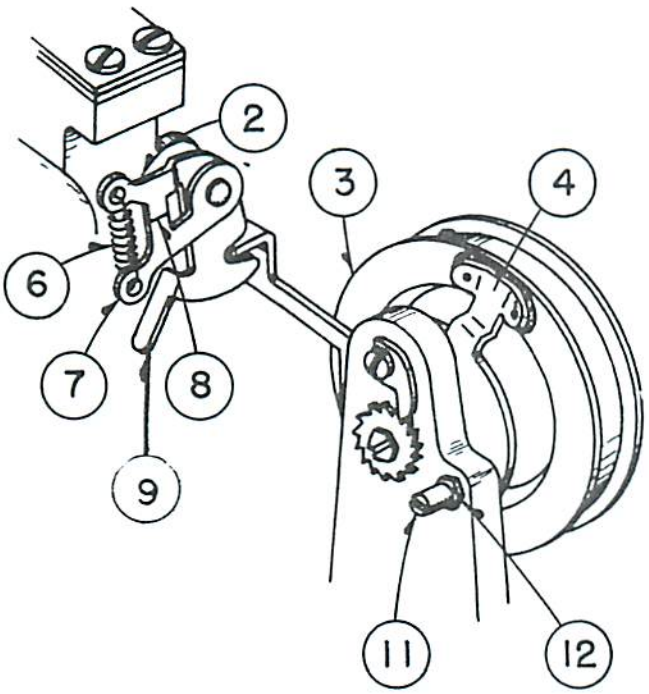
Step 1 – The left to right adjustment of the tab rack will get the rack in proper timing with the escapement. This adjustment will also insure that the proper tab stop has been set.

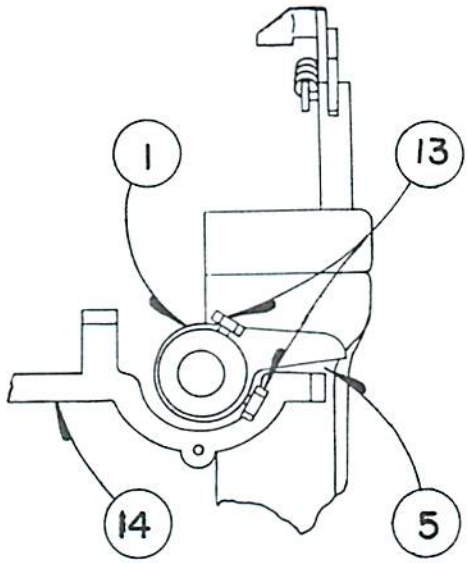
Depress the tab set key. Notice if plunger (9) contacts directly the top of the stop pin. To adjust, loosen screws (2) left and right. Loosen lock nut (4). Move the rack to the left or right as needed. Tighten screws (2). Using the carriage scale, set a stop pin at (5-10-15-20), etc. Tabulate to each of these stops and notice if the scale correctly reads 5-10-15-20, etc. If the carriage is stopping either one space under or one space over, readjust the tab rack to the left or to the right.

Step 2 – The up and down adjustment of the tab rack is to centralize the tab rack so that the pins may be fully set and unset. There should be a clearance of .010 between the top of the unset pin and the bottom of plunger (9), as at (8). At the same time, there should be a clearance of .185 between the bottom of the set pin and the top of the frame, as at (11). To adjust, loosen screws (2) left and right and move the tab rack up or down as needed. Check this at both ends of the carriage.

Step 3 – Depress the tab set key. Plunger (9) should push the pin down fully. To adjust, form arm (7) up or down as needed.

Step 4 – Depress the tab clear key. The clear blade should restore the set pins completely. To adjust, form arm (6) up or down as needed.





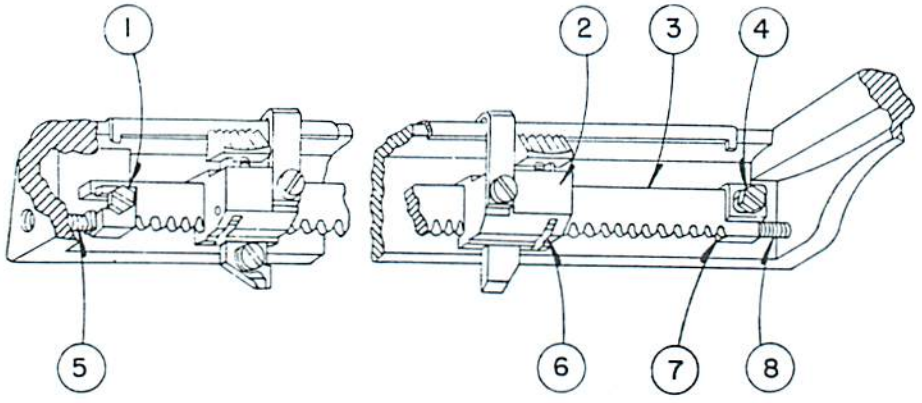
NOTE: TAB SET-CLEAR ADJUSTMENT SHOULD BE MADE PRIOR TO ADJUSTING THE TABULATOR

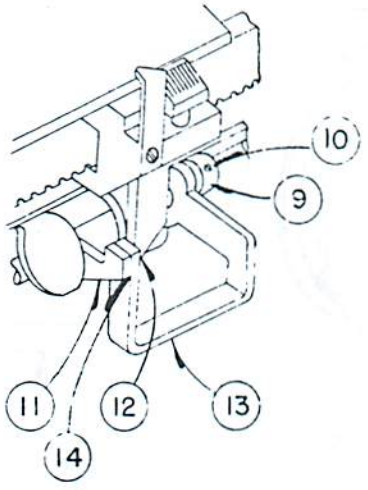
The tabultor section of the Underwood is adjusted in two steps. First check that all springs are connected and that all levers are free of binds.

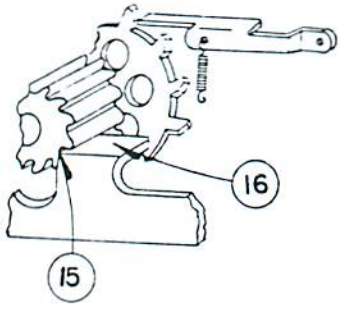
Step 1 – When the tabulator bar is in a neutral position (not depressed), there should be .003 clearance between lever (1) and arm (14), as at (5). To adjust, loosen screws (13) and move lever (1) up or down as needed. When the tab bar is fully depressed and latched, the carriage rack should clear the escapement pinion by at least 1/16''. Recheck the .003 clearance and also recheck the rack adjustments in the rack section.

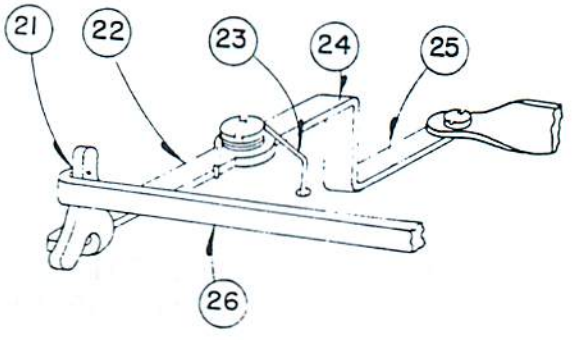
Step 2 – The tabulator brake is a friction-type brake with the brake pad rubbing against the spring drum.

CAUTION: The carriage must be in good adjustment and be absolutely free of binds. When the tab bar is in a neutral position (not depressed), pad (4) should not be contacting the spring drum. When the tab bar is depressed, there should be about .010 clearance, as at (8). To adjust, form arm (9). To adjust for more or less braking action of the carriage, loosen nut (12) and adjust screw (11) in or out as needed. NOTE: Keep the brake pad free of grease and oil.





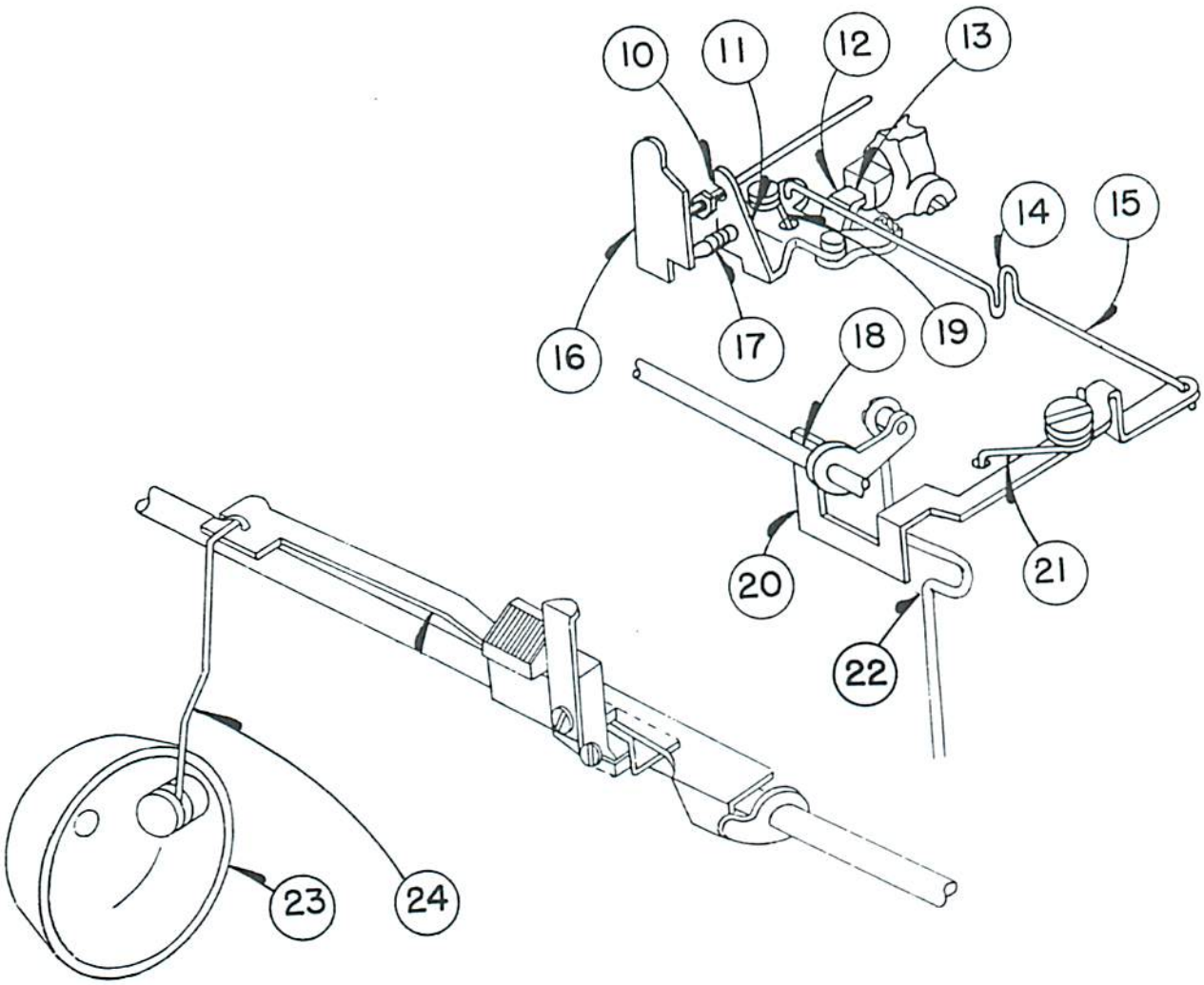




The Underwood is equipped with a floating rack which allows the carriage to move one space, yet holding the rack at a certain point. This is to insure that, no matter how hard or easy the carriage is returned, the left margin will remain the same. In other words, there will be no over or under banking.

In a normal position there is 3/32'' clearance between stop (11) and slide (13), as at (14). To adjust, loosen screw (10) and move collar (9) left or right. With the carriage in the banked or returned position, there should be .003 clearance between margin stop (2) and slide (13), as at (12). To adjust, loosen screws (1) and (4) and adjust screws (5) and (8) to the left or right as needed.

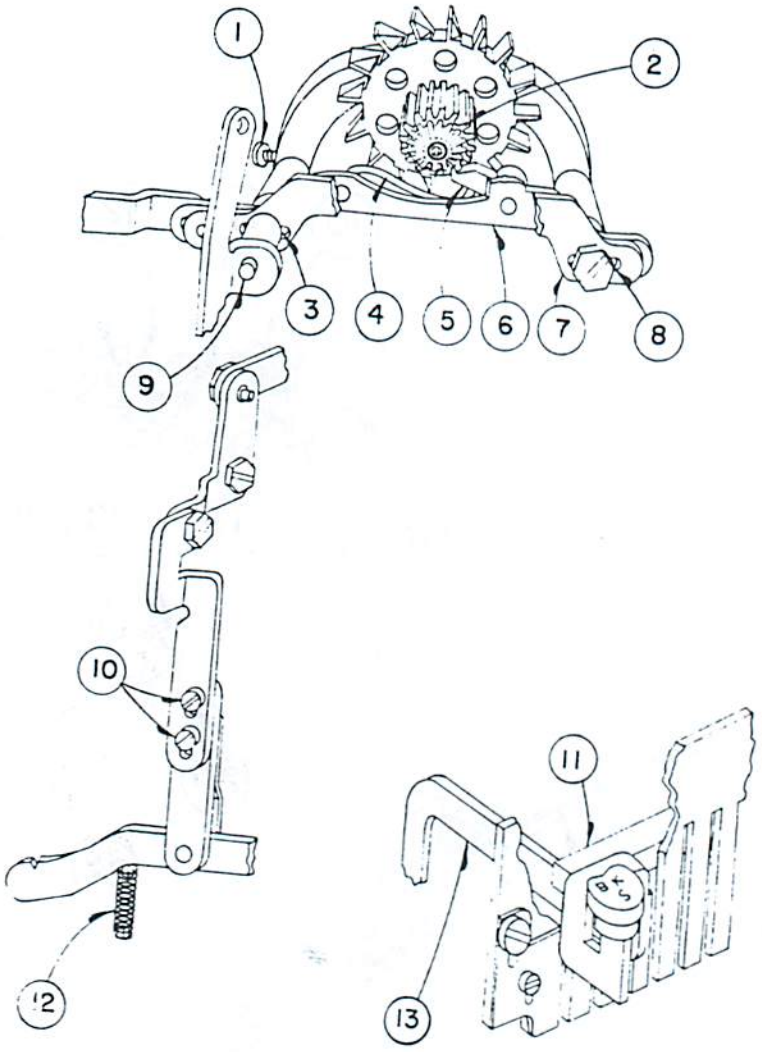
With the carriage pushed completely to the right, lock slide (16) should be engaged as deeply as possible into pinion (15). To adjust, form arm (24) at (25) left or right as needed.



The bell should ring about 7 or 8 spaces before the linelock occurs. It should ring clearly – loud enough to be heard. Form bell ringer (24) so that it will not rest against the bell when in a normal position.

The line lock should occur in one space of the escapement. Check that arm (20) is resting against rod (18) slightly. To adjust, form arm (18). When the right margin is against the stop, lock arm (11) should have complete hold on the rod, as at (10). To adjust, form link (15) at (14). Stop screw (17) should rest snugly behind plate (16). To adjust, move screw (17) in or out as needed.

The margin release key should pivot rod (18) high enough to clear arm (20). To adjust, form link at (22).



The back spacer should space back one and only one space when fully depressed slowly or moderately fast. The key lever should come back up with a snappy action. Check for binds, and check the condition of the springs before making adjustments.

Recheck the escapement check pawl. It should be in proper adjustment. (See Escapement Section) Check that pawl (5) is in good condition – not chipped or bent. The back space slide must be snug at pivot point (3) but also be free of binds. To adjust, loosen screw (1) and move stud (9) in or out as needed.

Push back space key down slowly. Pawl (5) should engage pinion (2) and move the pinion back one full space. To adjust, loosen screws (10) and shorten or lengthen the linkage. When the key lever is restored to normal, pawl (5) must <u>not</u> contact pinion (2). There should be a slight clearance between them.

NO. 467 OPEN END WRENCH (THIN)

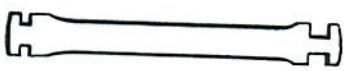
NO. 2-KM BACK SPACE BENDER

NO. 28 ESCAPEMENT WRENCH

NO. 31-KM BOX WRENCH

NO. 24 ALIGNING WRENCH

NO. 32-KM BOX WRENCH



NO. 43 BACK SPACE LINK BENDER

NOTES

REMINGTON INDEX

Illustrations provided through the courtesy of Remington Office Machines, Division of Sperry Rand Corporation.

Technical Material written by the author.

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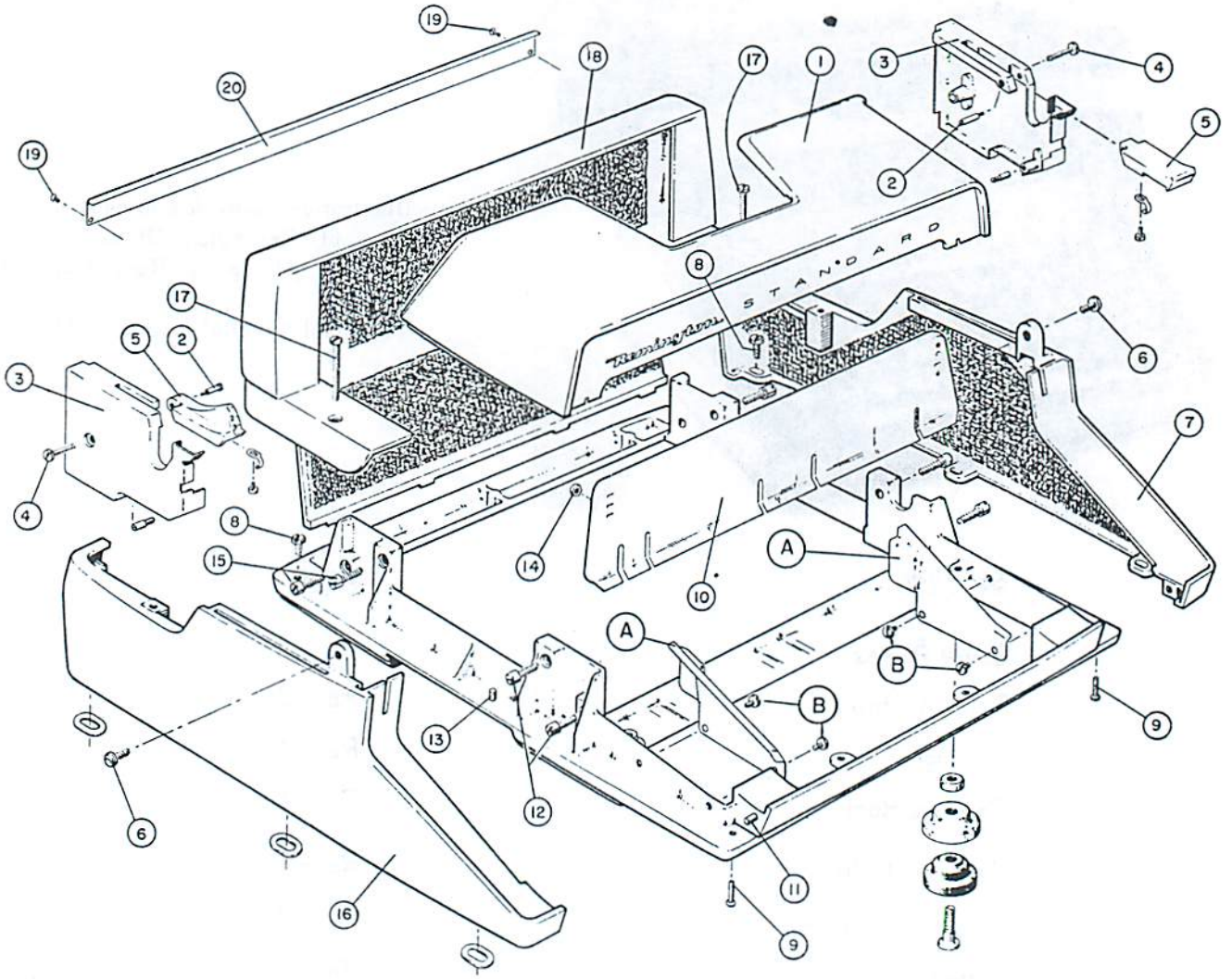
COVER PLATES — REMINGTON

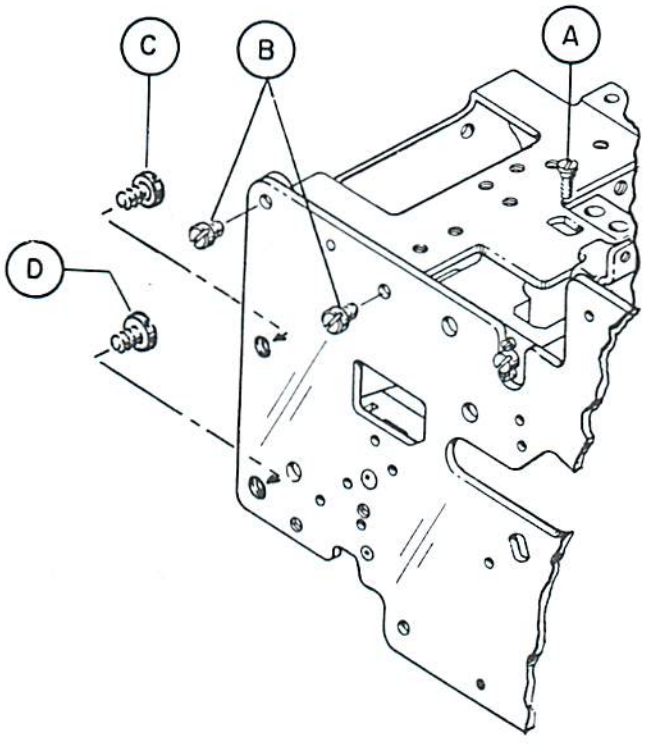


REMOVAL

Pull up on Plate (1).
Remove Screws (17) L & R.
Remove Plate (18).
Remove Screws (9) L & R.
Remove Screws (8) L & R.
Remove Screws (6) L & R.
Remove Left Plate (16).
Remove Right Plate (7).
Loosen Nuts (14) L & R.
Remove Plate (10).
Remove Platen.
Remove Screws (2) L & R.
Remove Plates (5) L & R.
Remove Screws (4) L & R.
Remove Plates (3) L & R.

REPLACEMENT

Position Plates (3) L & R.
Install Screws (4) L & R.
Position Plates (5) L & R.
Install Screws (2) L & R.
Install Platen.
Position Plate (10).
Tighten Nuts (14) L & R.
Position Plate (7).
Position Plate (16).
Install Screws (6) L & R.
Install Screws (8) L & R.
Install Screws (9) L & R.
Position Plate (18).
Install Screws (17) L & R.
Snap Plate (1) into place.



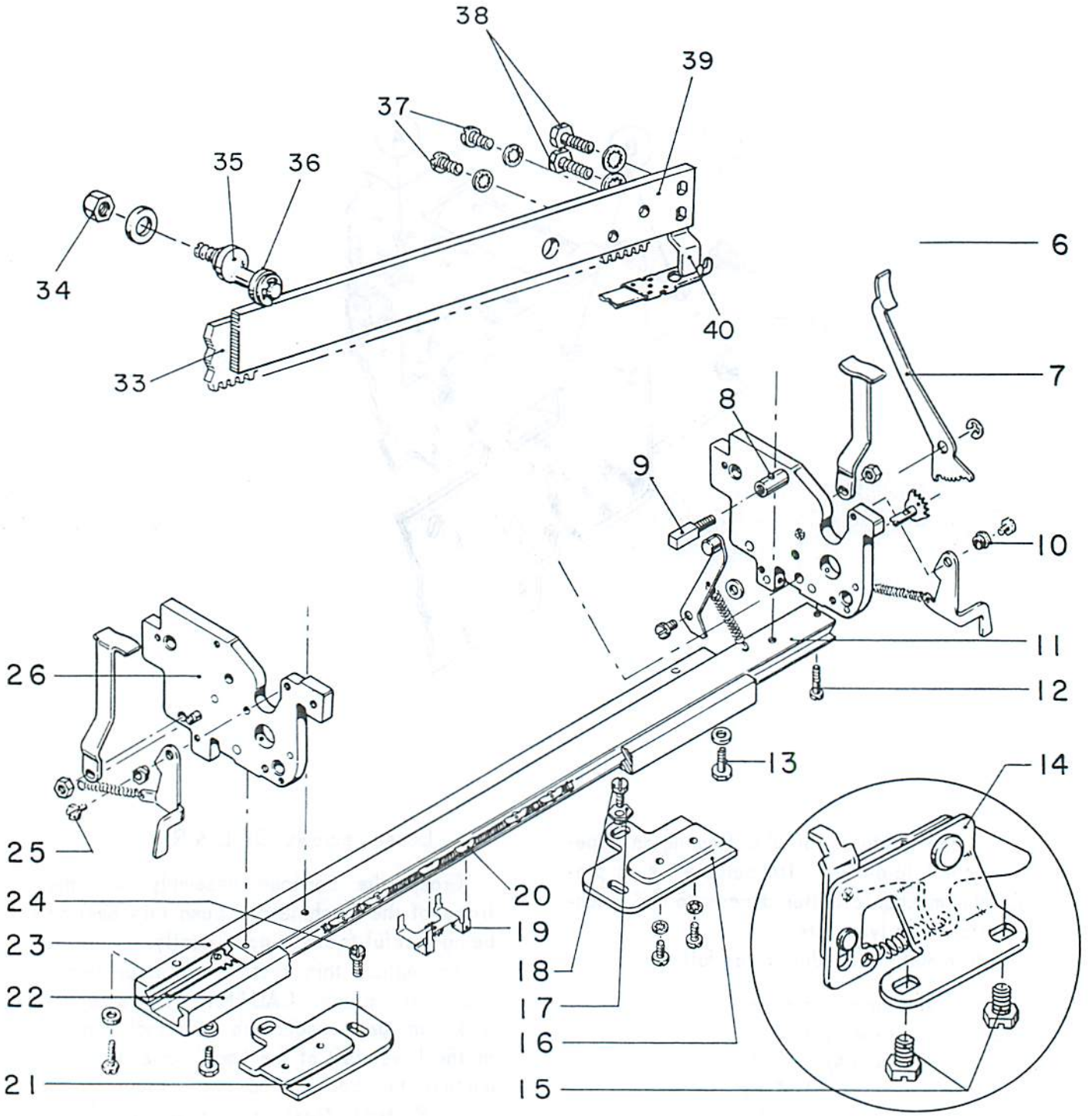
One of the features of the Remington typewriter is the fold-a-matic. Its purpose is to provide for the mechanic better access to the mechanical parts of the typewriter.

The fold-a-matic procedure is as follows:

Remove the top cover plate.
Remove the rear panel.
Remove screws (A) (L & R)
Remove screws (B) (L & R)
Remove screws (C) (L & R)
Loosen screws (D) (L & R)

Grasp the carriage assembly and the back frame of the machine and push this section back, being careful to lay it down easily.

To replace this section, lift it up and push it back into place. CAUTION: Be sure the line lock arm goes under the line lock link located at the lower left of the back frame. Hold pressure against the back frame and replace screws (A) (L & R) first. Next replace screws (B) and (C) (L & R). Then tighten screws (D) (L & R).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To remove the carriage and the carriage rails from the base of the machine:

Remove Drawband (Place on Anchor Stud).
Remove Lock Nut and Washer (34).
Remove Eccentric Stud (35).
Mark position of Plates (21) and (16). (The Ring and Cylinder must stay in place when replacing the Carriage).
Remove Screws (24) (L & R).
Remove Screws (18) and Eccentric Nut (17) (L & R).
Remove Carriage and Carriage Rails.

To remove the carriage from the carriage rails:

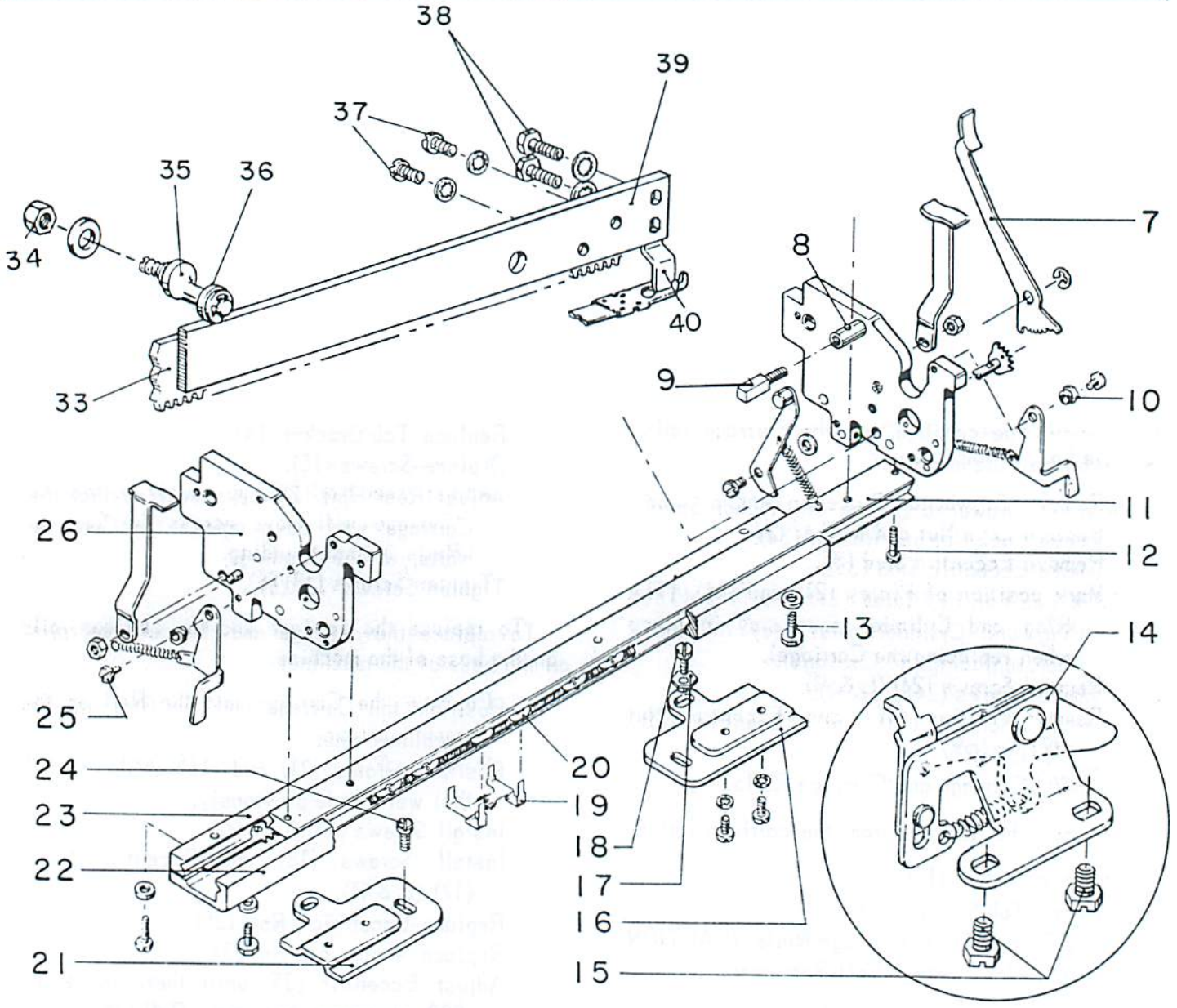
Remove Screws (15).
Remove Tab Stop Bracket (14).
Slide Carriage from Carriage Rails: (CAUTION Watch for Carriage Roll Retainers).

To replace the carriage on the carriage rails:

Loosen Screws (13) (6).
Move Rear Rail (23) back.
Place Carriage Roll and Retainer (19) in the center of the Rail.
Replace Tab Bracket (14).
Replace Screws (15).
Adjust Rear Rail (23) up snugly so that the Carriage will move across the Carriage Rails, without binding.
Tighten Screws (13) (6).

To replace the carriage and the carriage rails on the base of the machine:

Position the Carriage and the Rail on the machine frame.
Position Plates (21) and (16) at the marks that were made previously.
Install Screws (24) (L & R).
Install Screws (18) and Eccentric Nuts (17) (L & R).
Replace Eccentric Roll (35).
Replace Washer and Nut (34).
Adjust Eccentric (35) until there is about .002 clearance between Roll (36) and Rack Rail (39). Left and Right Side should be the same.
Tighten Lock Nut (34).



The rack must mesh as deeply as possible in the pinion without actually bottoming in the pinion gear. The support rail (39) should just touch the roll that is on the front of the pinion gear. There should be .002 clearance between the top of support rail (39) and roll (36).

To adjust, loosen screws (37) (five of them – one in the center) and move rack (33) up. Snug screw (37). NOTE: This is a temporary adjustment so that you can adjust the support rail (39).

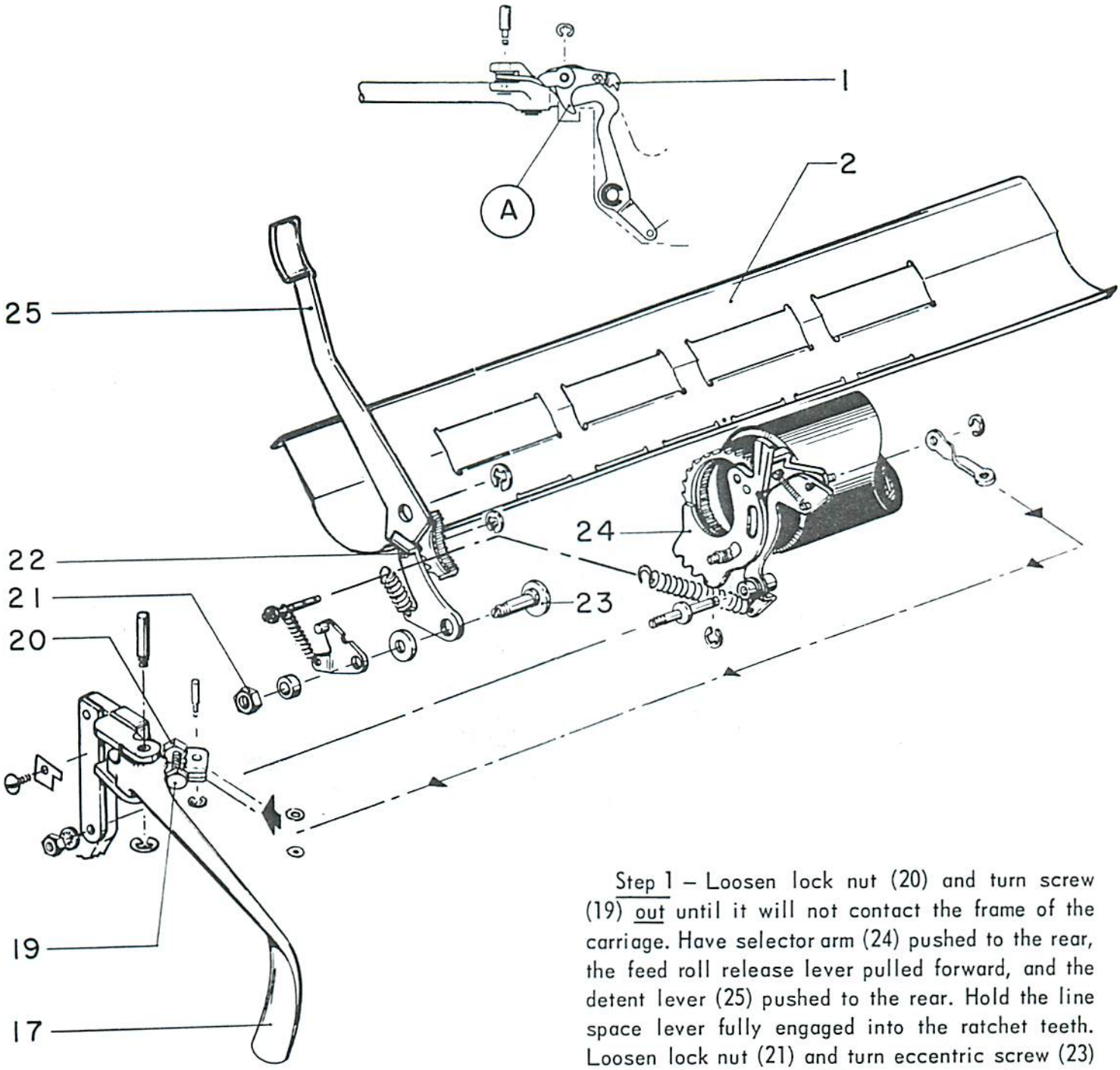
Loosen screws (38), four of them, and move the support rail so that the bottom edge just touches the roll on the front of the pinion. Check this at both ends. Tighten screws (38). Adjust roll (36) so that there will be .002 clearance between roll (36) and the top edge of support rail (39).

Loosen screws (37), five of them. Adjust rack (33) up or down until it has good mesh with the pinion but does not bottom in the pinion. Check this at both ends of the carriage. Tighten screws (37).

RING AND CYLINDER

IMPORTANT: REVIEW RING AND CYLINDER IN THE GENERAL INFORMATION SECTION.

The ring and cylinder adjustment is made by loosening screws (24) and (18) (left and right). Turn eccentric nut (17) forward or rearward until there is a slight "drag" on one sheet of paper between the platen and a type bar.



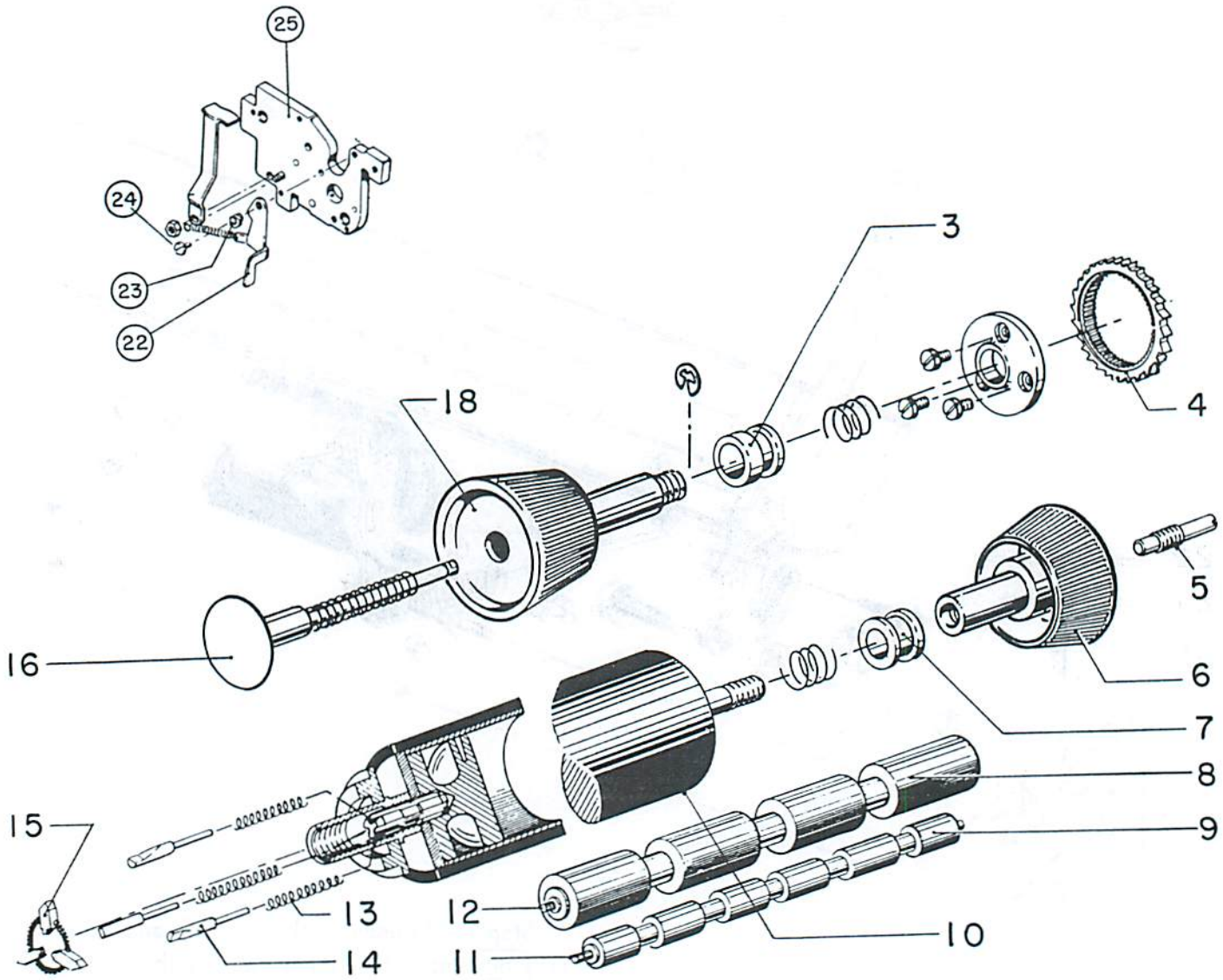
The line space lever should be bind-free. It should snap back to normal position as it is released after making a line space. Check all springs for proper tension. The line space lever should be straight – no sagging at the end. Form this lever up until it is parallel with the base of the machine.

The Remington line spacer is adjusted in two steps. *The first step* is for proper spacing; the second is the lever limit.

Step 1 – Loosen lock nut (20) and turn screw (19) out until it will not contact the frame of the carriage. Have selector arm (24) pushed to the rear, the feed roll release lever pulled forward, and the detent lever (25) pushed to the rear. Hold the line space lever fully engaged into the ratchet teeth. Loosen lock nut (21) and turn eccentric screw (23) until ratchet arm roll (22) is positioned exactly between 2 teeth of the ratchet. Tighten lock nut (21).

Step 2 – Hold the line space lever fully engaged with the ratchet teeth. Adjust screw (19) in until it just barely touches the frame of the carriage. Tighten lock nut (20).

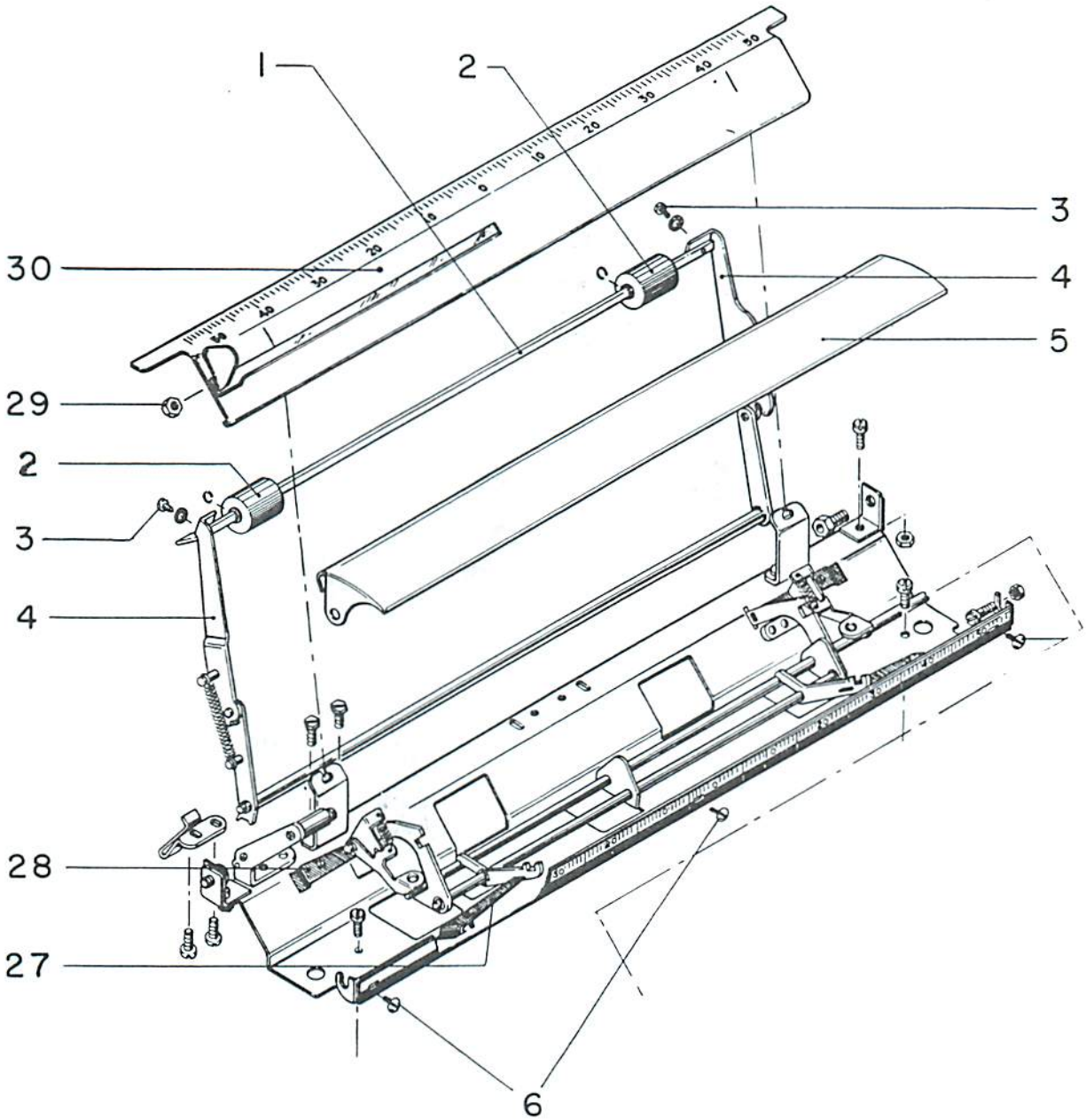
Check the line space lever by spacing a single line and releasing the lever very slowly. Notice if the platen creeps either frontward or rearward. It should *not move* at all. If it does, readjust screw (23) and screw (19).



The platen should first be checked for its condition. Review the Platen and Feed Rolls section in the General Information Section before making a platen adjustment. When you are convinced the platen is usable, then check the adjustments.

Raise the paper bail up, pull the feed roll release lever forward, and pull the ratchet release lever forward. The platen should turn freely without binding. There should be no end play. To adjust, loosen screw (5) about 3 or 4 turns. Tighten or loosen the right platen knob (6) as needed. Tighten screw (5).

There should be no up or down movement in the platen clamps (22). To adjust, loosen screw (24) and turn eccentric (23) as needed. The platen should rest snugly in the platen grove in side frame (25).

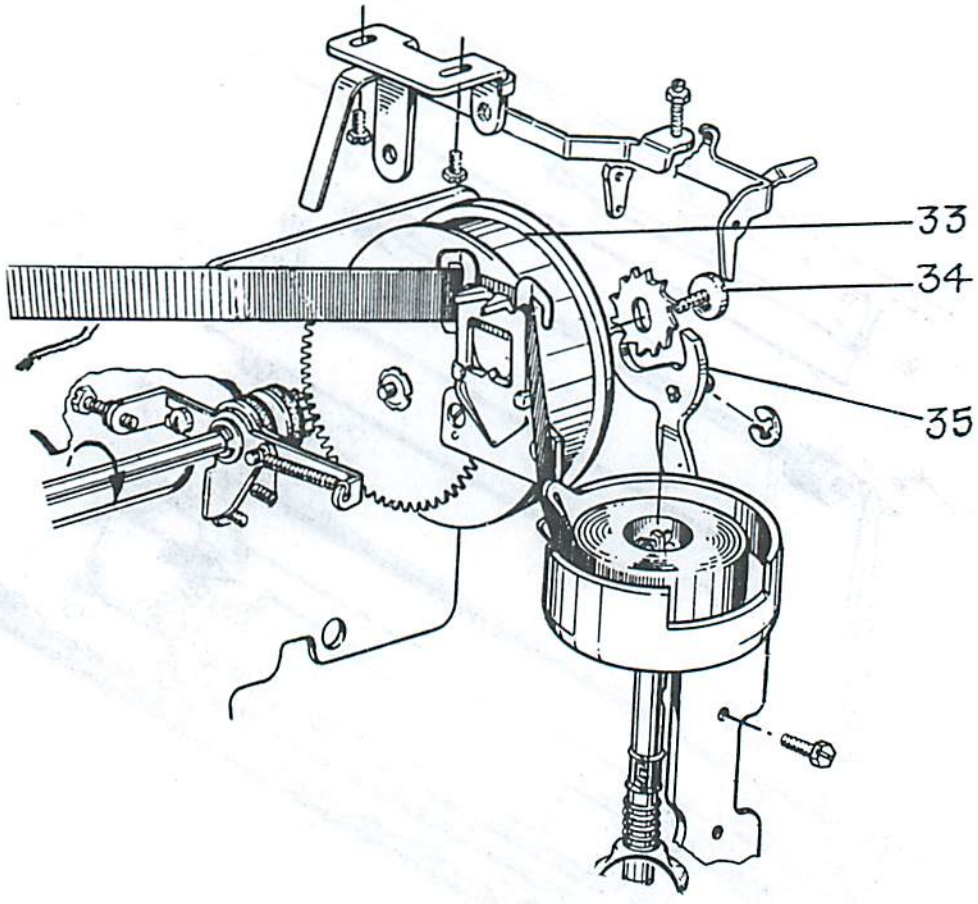


The front and the rear feed rolls should be in good condition. They should turn freely on their shafts. Remove the feed roll shafts and clean them so that they will not become gummy and hard to turn.

Check the feed roll tension by placing a strip of paper *about* one inch wide between the platen and the feed rolls and pulling it out. There should be a slight "drag" on the paper.

To adjust the rear feed roll tension, turn the adjusting screws in or out to give spring (28) more or less tension.

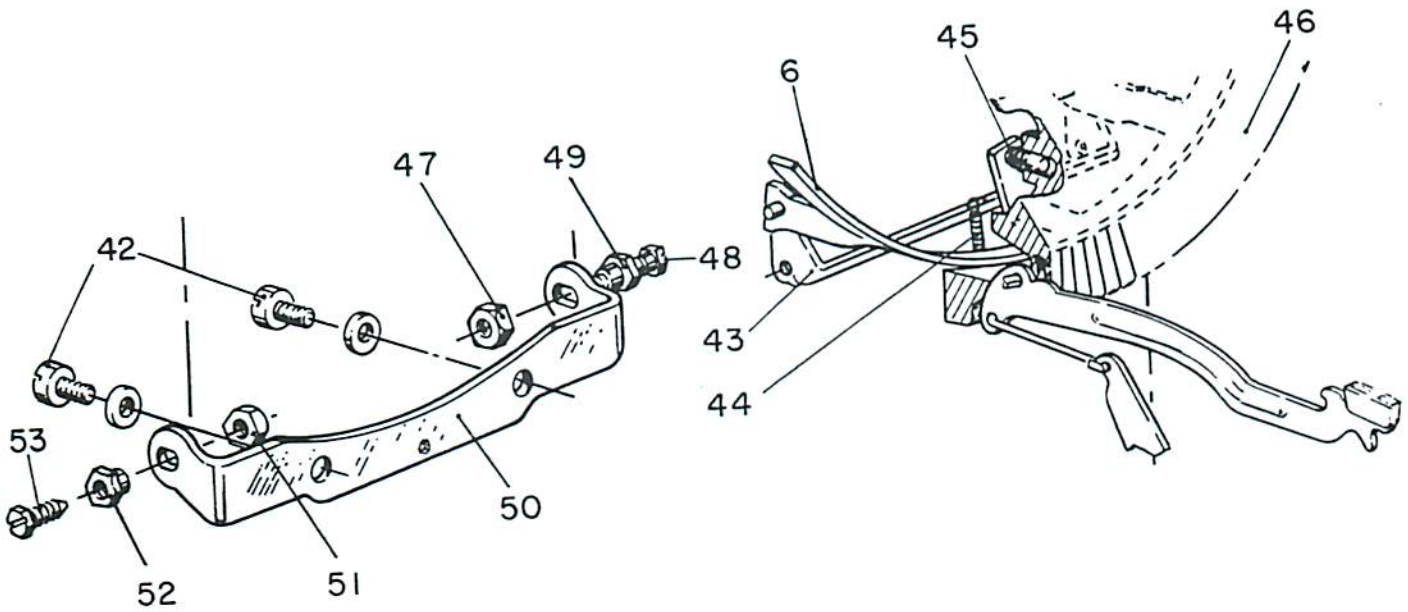
To adjust the front feed roll tension, turn the adjusting screws *in or* out to give spring (27) more or less tension.



The mainspring should have sufficient tension to space the carriage to the left with the same snappy action on the right end of the carriage as well as the left end. It should also set up the line lock mechanism when the operator reaches the extreme right end of the carriage.

To adjust for more tension, turn screw (34) clockwise (facing the rear of the machine). To decrease the tension, move pawl (35) left to right, back and forth.

Check the condition of the drawband. If it is worn or frayed, replace it with a new one.



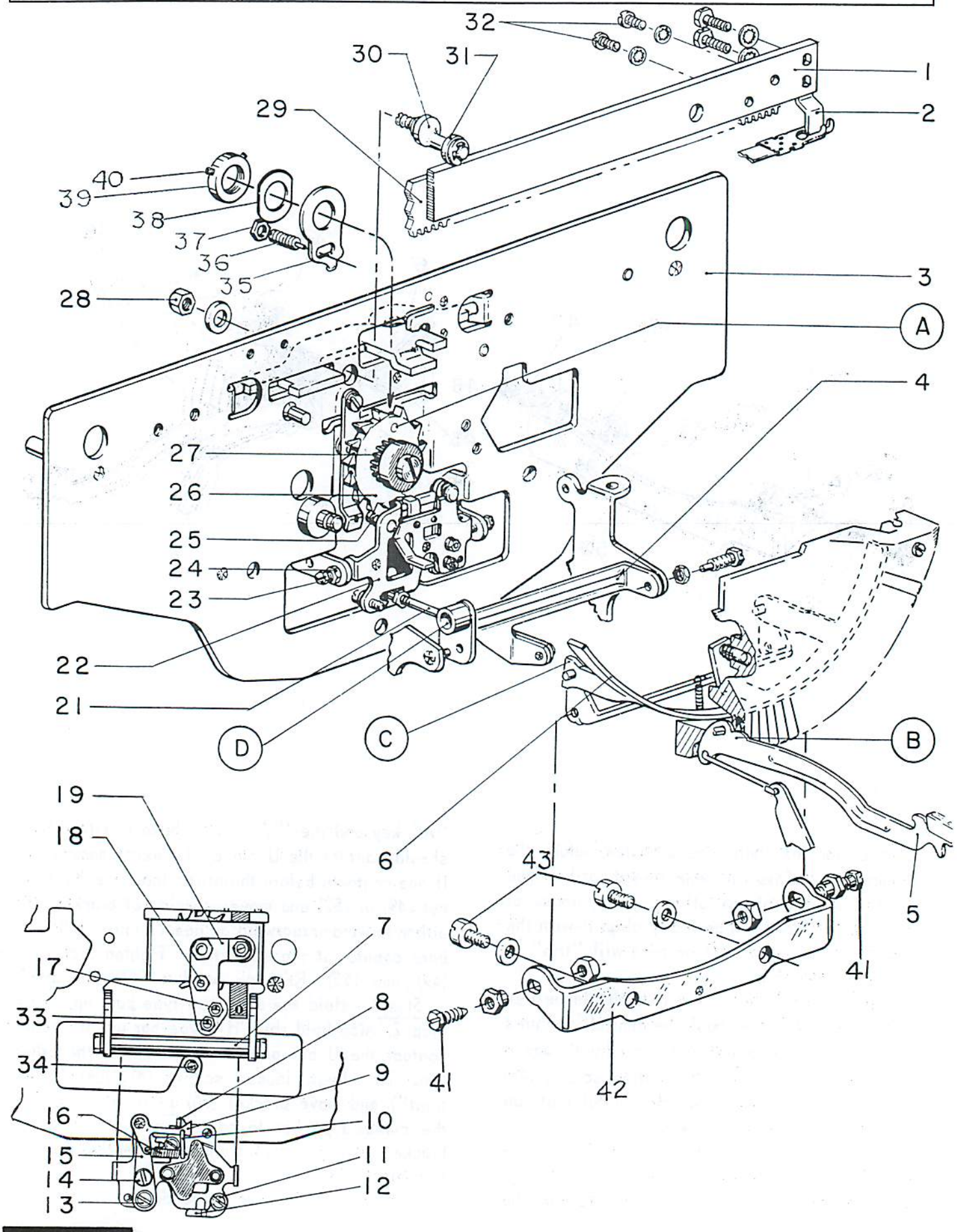
The U bar (6) should be adjusted before the escapement trip. This adjustment need not be made as often as some of the others. The purpose of adjusting the U bar is to perfectly align it with the segment, insuring that all type bars will "trip" at exactly the same place.

Step 1 – The U bar bracket (43) should be free on its pivots. U bar (6) should be centrally located in the slot of the segment (46). To adjust, loosen lock nuts (49) and (52) and position screws (48) and (53) in or out as needed. Be careful that you do not put a bind in bracket (43).

Step 2 – Hold your thumb at point (45) and raise *two type bars – one* from the left side of the segment and one from the right side. (For example, the "A" key and the "½" key.) These two type bars should contact the U bar at the exact same time. If one contacts before the other, loosen either lock nut (49) or (52) and move one side of bracket (43) either forward or rearward as needed until both type bars contact at the same time. Tighten lock nuts (49) and (52). Recheck bracket (43) for binds.

Step 3 – Hold the same two type bars up, as in Step 2. Also hold the "H" type bar up. It should contact the U bar at the same time as the other two. To adjust, loosen screws (4) (just "snug tight") and move bracket (50) up slightly to allow the center type bar to contact sooner. *Move the* bracket down slightly to allow the center type bar to contact *later.*

Recheck the U bar for its freedom.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Before adjusting the Remington escapement, recheck the following adjustments. These must be properly adjusted.

1. Carriage Adjustment.
2. Escapement Rack Adjustment.
3. Ring and Cylinder Adjustment.
4. Universal Bar Adjustment.
5. Segment snug in side rails.
6. Drawband tension.

Step 1 – The distance between the loose dog (9) and the rigid dog (8) should be .045. This is a factory standard adjustment and there should be no variation. If this distance is incorrect and you must adjust it, form the loose dog in or our as needed. CAUTION: Check the loose dog for binds – it must be continually free.

Step 2 – The loose dog should contact the starwheel tooth solidly with the bottom tooth of the starwheel pointed straight down. This is called the 6 O'clock position. To adjust, loosen lock nuts (24) (left & right) and adjust pivot screws (23), which will position the rocker either left or right as needed. Tighten lock nuts (24).

Step 3 – The front limit should be adjusted until the front edge of the loose dog is .015 to .020 back from the front edge of the starwheel tooth. To adjust, loosen the lock nut of screw (34) and adjust screw (34) in or out as needed. Tighten the lock nut.

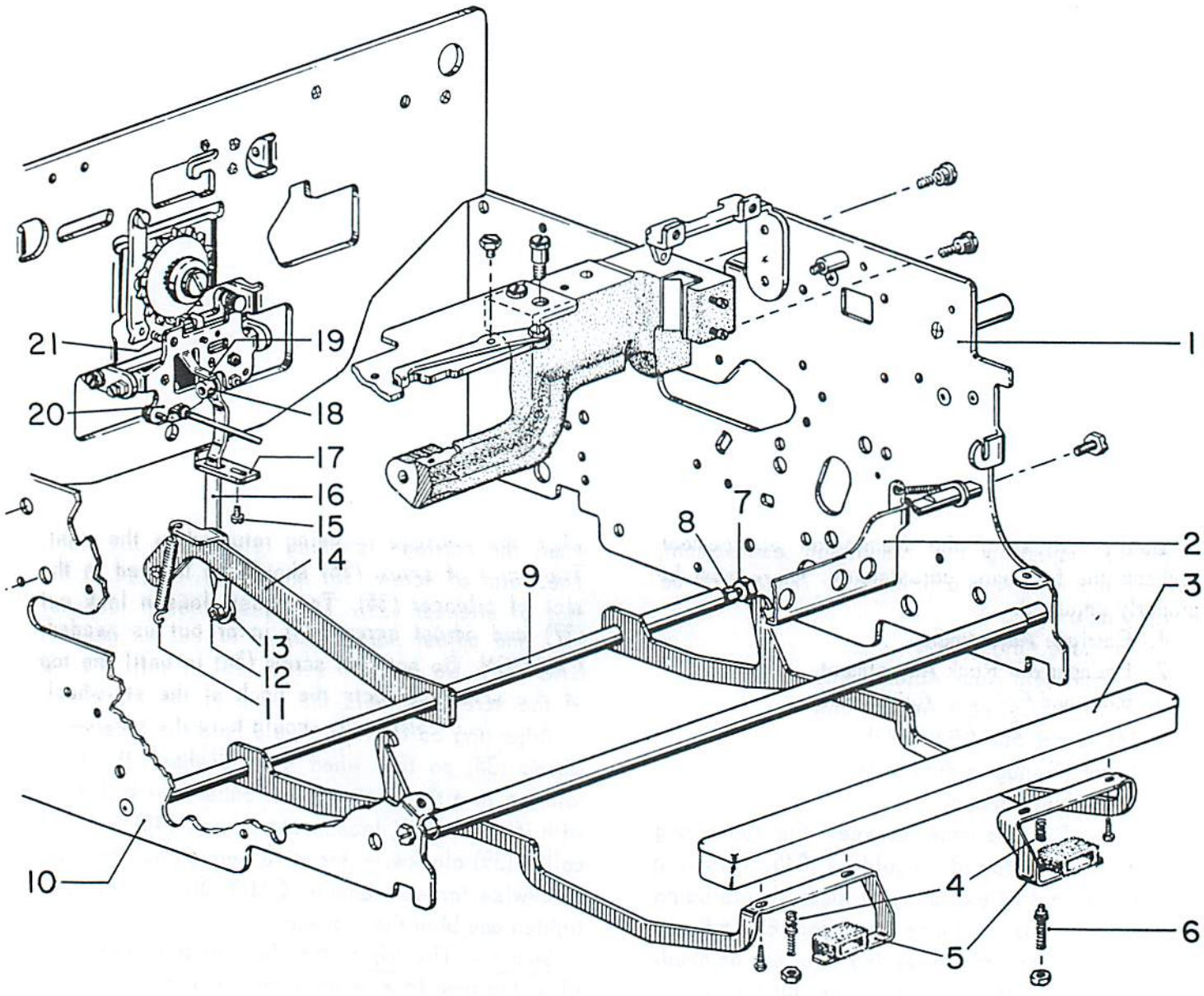
Step 4 – The purpose of silencer (35) is to force the loose dog down out of the path of the starwheel when the carriage is being returned to the right. The point of screw (36) should be located in the slot of silencer (35). To adjust, loosen lock nut (37) and adjust screw (36) in or out as needed. CAUTION: Do not turn screw (36) in until the top of the screw contacts the back of the starwheel.

Adjusting collar (39) should hold the tension on spring (38) so that when the starwheel starts its rotation in either direction, silencer (35) will move with it. To adjust, loosen set screws (40) and turn collar (39) clockwise for more tension and counterclockwise for less tension. CAUTION: Do not overtighten and bind the starwheel.

Step 5 – The trip of the Remington should occur when the type face of the type bar just touches the ribbon. To adjust, turn the adjusting nut on shaft (21) clockwise, allowing the trip to occur farther from the ribbon; adjust counterclockwise, allowing the trip to occur closer to the ribbon. Recheck the U bar adjustment to see if there is any variation in the trip of the different type bars.

Step 6 – Hold a type bar up to contact the platen. There should be a slight additional backward movement in the rocker assembly (22). To adjust, loosen the lock nut of screw (33) and adjust screw (33) as needed.

Step 7 – The rocker should have sufficient tension to return to the normal position after it has been rocked backward. To adjust for more or less kick back spring tension, loosen the lock nut of screw (17) and turn screw (17) in or out as needed.



NOTE: ALL ESCAPEMENT ADJUSTMENTS MUST BE CORRECT BEFORE SPACE BAR ADJUSTMENT.

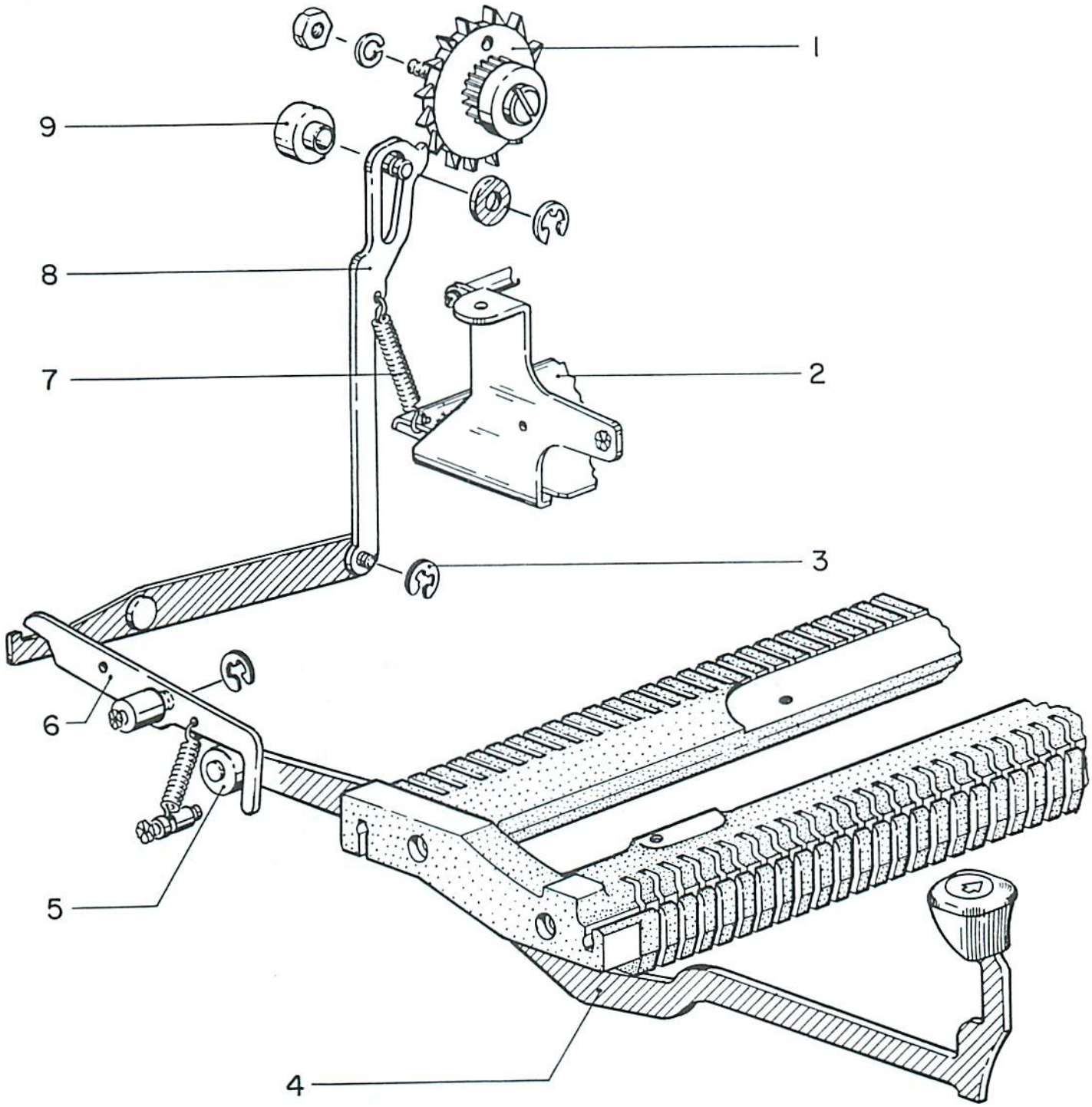
The space bar should operate freely. It should snap back after being depressed. Check spring (11) for its condition. Check shaft (9) for slight end play. It is better that shaft (9) have just a little end play than to be binding. Adjust lock nut (7) and screw (8) as needed.

The space bar (3) should be level and straight. The space bar, in a normal position, should be 3/8" below the bottom row of keys. To adjust, form extension arms (5). After making this adjustment, recheck to see if the space bar is still level. Also recheck line lock bail (2) for binds. (See line lock section.)

There must be .010 clearance between roll (18) and arm (19). To adjust, loosen lock nut (12) and turn screw (13) as needed.

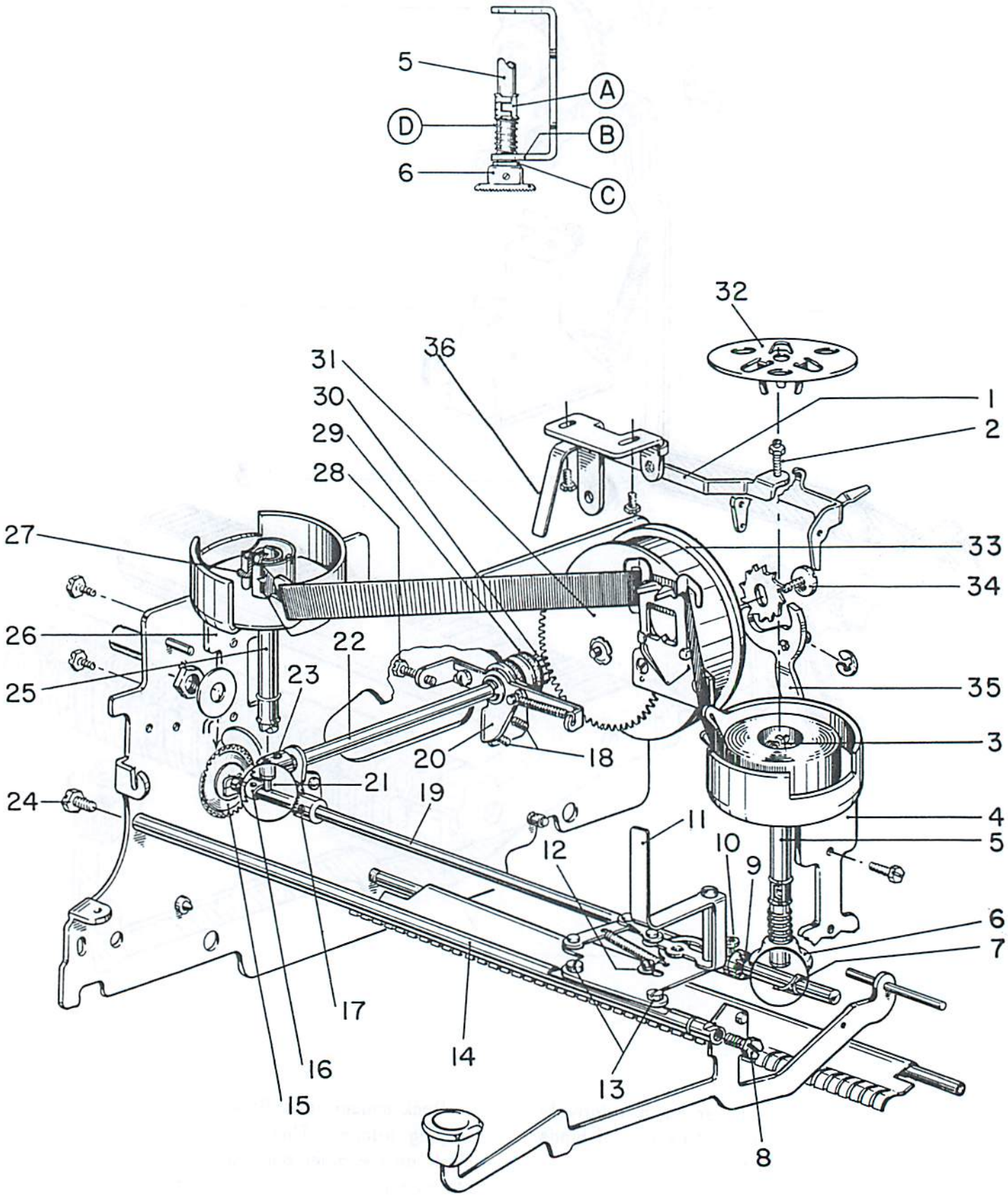
Depress the space bar slowly. It should go down about 1/4" and then trip. It should then travel about another 1/4" and stop. Adjust screws (6) (left & right) so there is still a small amount of play in the rocker when the space bar is fully depressed. (See the back limit adjustment in the escapement section.)

REMINGTON BACK SPACER



The Remington back spacer is a relatively simple operation. All parts must be free of binds. Roll (5) must be in good contact with arm (6). In a normal position, the point of arm (8) should *not be touching* the starwheel teeth. To adjust, form the back of arm (4) up or down as needed.

Back spacer pawl (8) will differ on machines of varying pitches. This pawl must be of the same pitch as the other parts on a machine. It will be stamped to indicate its pitch. If it happens not to be stamped, it is a 10 pitch pawl.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The ribbon feed is activated by the mainspring drum. When the operator types and moves the carriage to the left, the mainspring drum activates shaft (22) which turns gear (15). This gear turns shaft (19) which then turns the ribbon spool shafts.

Shaft (22) is disengaged from the mainspring drum when the carriage release levers, or the tabulator bar, are depressed. This is done through bracket (1). There should be slight clearance between arm (36) and the end of shaft (22). To adjust, loosen the lock nut and adjust screw (2).

Pinion gear (30) should mesh as deeply as possible in the teeth of the mainspring drum without bottoming. To adjust, turn screw (28) in or out as needed.

With spool shaft (5) held down, there should be about .008 clearance between gear (6) and bracket "B" as at "C". To adjust, loosen set screw and move gear (6) up or down as needed.

Both left and right spool shafts (5) should have sufficient tension to support a full spool of ribbon. To adjust, move spring collar A up or down as needed.

The high points of reverse cams (7) and (16) should be *opposite each other* – one up while the other is down. These points should be pointing in.

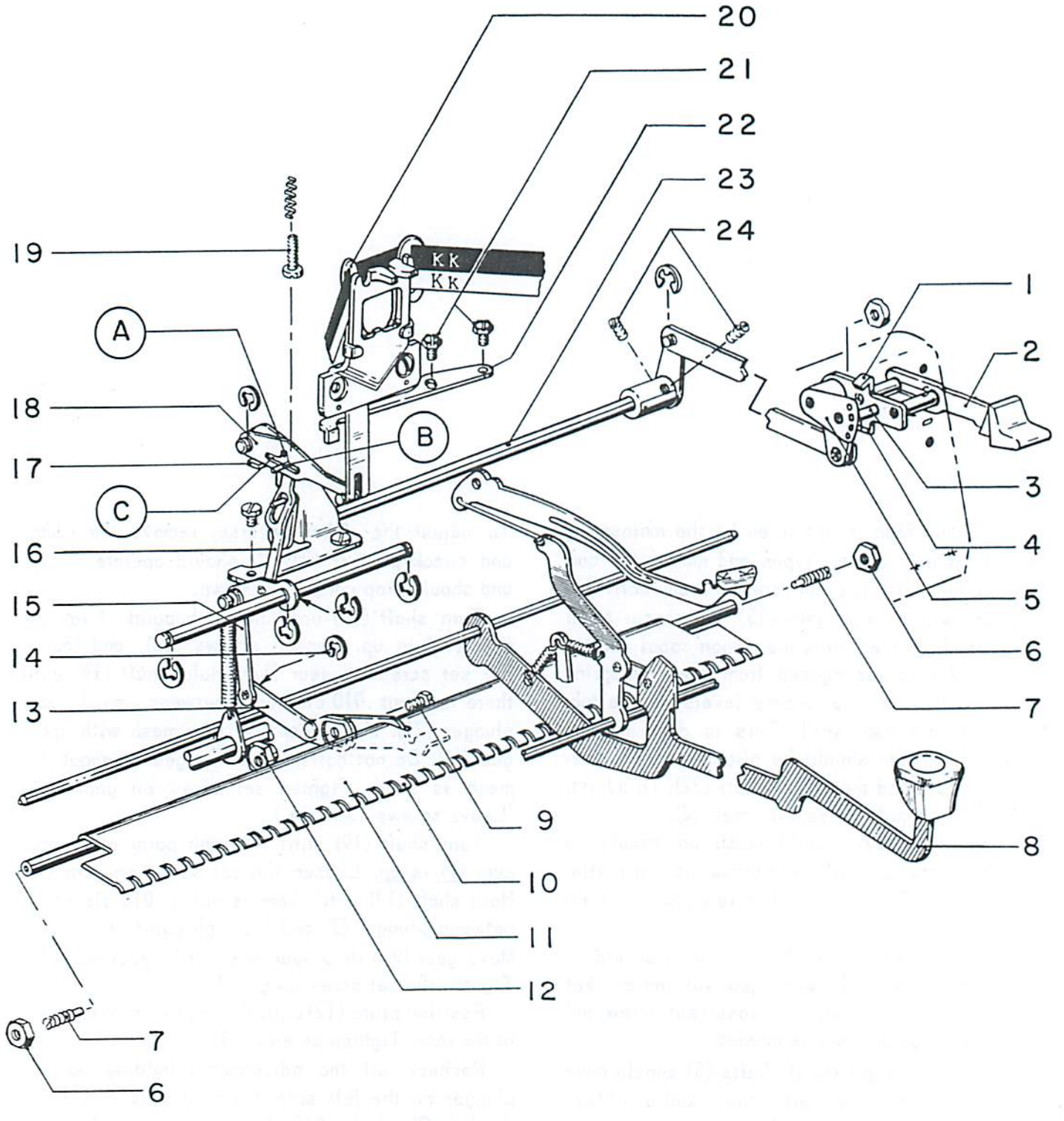
To adjust the ribbon reverse, remove the ribbon and check plunger (21). It should operate freely and should drop completely down.

Turn shaft (19) until the high point of reverse cam (16) is up. Loosen screws (13), and loosen the set screw on gear (17). Hold shaft (19) until there is about .010 clearance between cam (16) and plunger (21). Move gear (17) into mesh with spool gear (6). Do not bottom it in the gear – about 2/3 mesh is good. Tighten set screw on gear (17). (Leave screws 13 loose.)

Turn shaft (19) until the high point of reverse cam (7) is up. Loosen the set screw on gear (9). Hold shaft (19) until there is about .010 clearance between plunger (3) and the high point of cam (7). Move gear (9) into proper mesh with spool gear (6). Tighten the set screw on gear (9).

Position plate (12) until the toggle is completely to the rear. Tighten screws (13).

Recheck all the adjustments holding up the plunger on the left side and moving lever (11) to the left. Check the .010 clearance between the right plunger and the cam. Hold the right plunger up and move lever (11) to the right. Again check the .010 clearance between the left plunger and the cam.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NOTE: Adjust the Ring and Cylinder, "On Feet", and Motion before Bichrome.

The bichrome section of the Remington is adjustable in steps. These steps should be followed in sequence. Check that all bichrome parts are free – especially the vibrator (20).

Step 1 – The rest position is the normal position of the vibrator (20). The fingers (10) of plate (11) should line up perfectly with the bottom of each key lever (8). To adjust, loosen lock nut (6) and turn screw (7) in or out as needed.

The high point of eccentric (12) should be toward the front of the machine. Loosen screw (9) and turn the eccentric nut.

Remove clip (14) and disconnect arm (13) from arm (15). Depress the shift key and lock it down. Position the bichrome lever (2) in the stencil position. Hold the underscore type bar up to the platen. The underscore key should be 1/32" above the top of the ribbon. To adjust, form rest plate (17) up or down as needed.

Hold plate (10) up against the key levers. Check that arm (18) is resting on plate (17). The hole in arm (13) should line up with the stud on arm (15). If it does not, form arm (13) up or down as needed. CAUTION: Do not use eccentric screw (12) for this. Connect arm (13) and arm (15) and replace the clip. This should not have disturbed the rest position of the vibrator. If it has, form arm (13) again.

Step 2 – The throw adjustment's purpose is to raise the ribbon to the proper height to print. Loosen screws (21) and move plate (22) back out of the way. Turn screw (19) up about three turns. Position the bichrome lever (2) in the stencil position. Stud B should be located correctly so that when a key lever is depressed Stud B will move up into the center of slot A. To adjust, loosen screws (24) and turn shaft (25) as needed. Tighten screws (24).

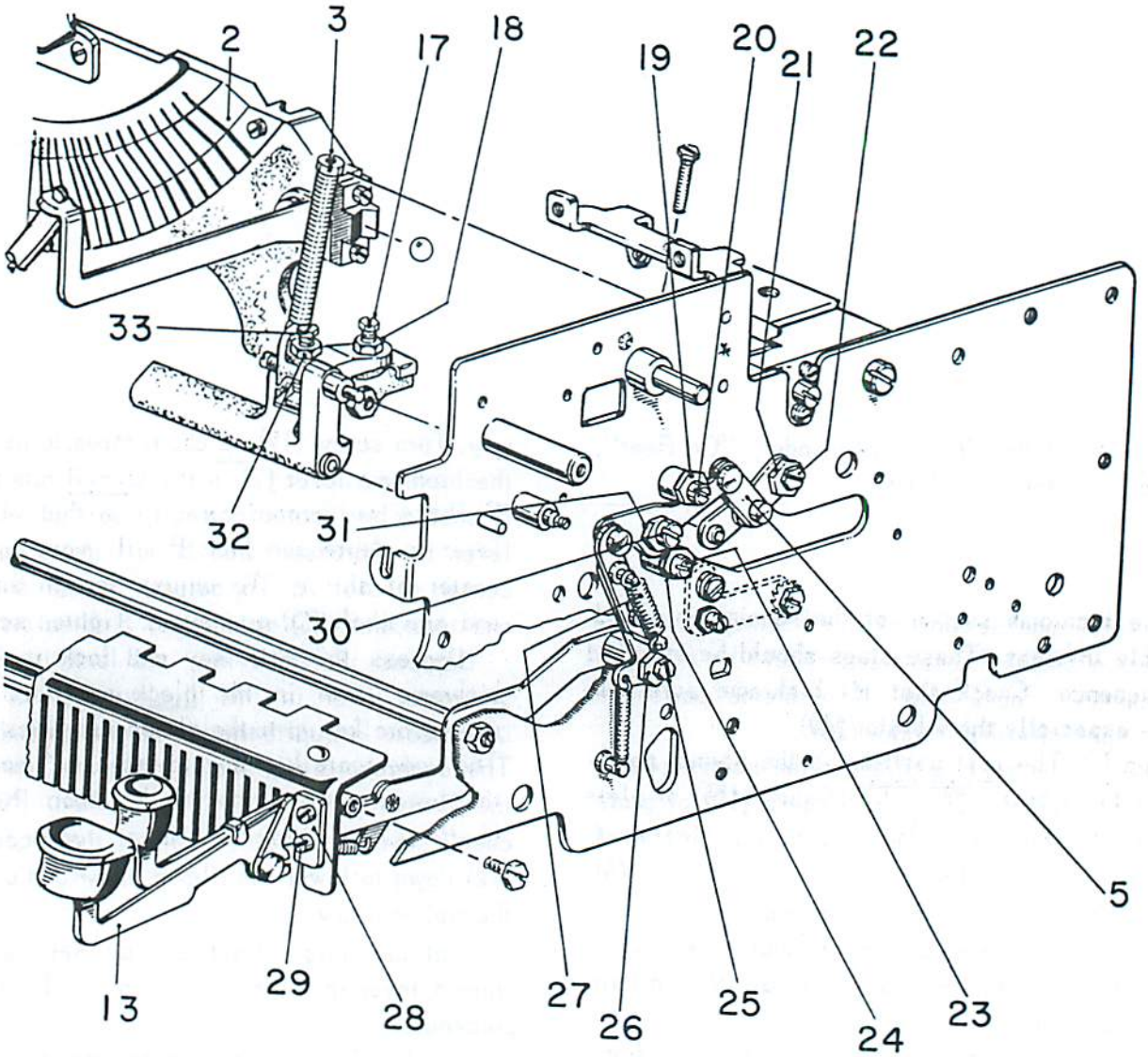
Depress the shift key and lock it. Place the bichrome lever in the black position. Hold the underscore key up to the platen and press in lightly, The underscore key should make an impression in the lowest part of the black ribbon. Repeat this check several times. To adjust, turn eccentric nut (12) down to lower the ribbon throw and up to raise the ribbon throw.

Continue this adjustment by setting the bichrome lever in the red position and following the procedure.

Step 3 – The upstop limits are adjustable to insure that the ribbon vibrator is not thrown beyond the point of proper print. To adjust, put the bichrome lever in the black position. Hold the underscore key up to the platen. The top of plate (18) should just contact screw head (19). Turn the screw in or out as needed.

Position the bichrome lever to red and hold the underscore key up to the platen. Adjust plate (22) up or down by forming it until it just touches plate (18).

Step 4 – Each key should print all black or all red, but sometimes a condition will exist where, although set in black, a key will include some red also. Another time a key will print all black, yet leave off the top of the letter. If either condition occurs, form the individual fingers (10) for the troublesome key lever – either up or down as needed.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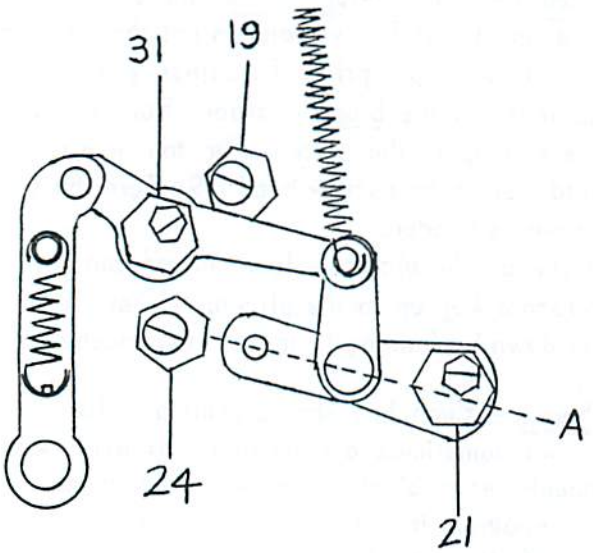
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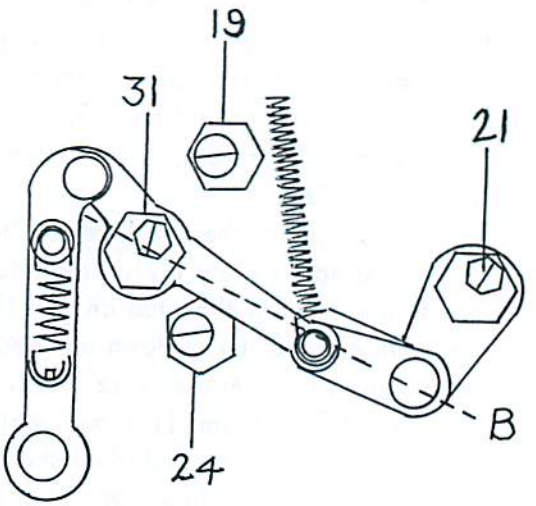
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The "on feet" and motion adjustment of the Remington typewriter must be done by steps in sequence. When any one of these steps is found to be necessary, all of them must be followed in sequence. If you follow them to the letter, the on feet and motion adjustment is relatively simple.

First check that the segment is free of binds, yet snug in the rails.

Step 1 – Loosen lock nuts (32) and (18). Back out screws (33) and (17) about two complete turns.

Step 2 – Loosen screws (30) and (22) and turn eccentric nuts (31) and (21) until the largest portion of the nuts is toward the bottom. This is also referred to as placing the high points toward the bottom. Tighten screws (30) and (22).

Step 3 – With the shift key up or in the small letter position, there should be an imaginary straight line through the points in line "A". (See Figure A.) Loosen screw (20) and adjust eccentric nut (19) to get the toggles in this straight line. This step is important – you must have a perfect straight line. Tighten screw (20).

Step 4 – With the shift key down or in the capital position, there should be an imaginary straight line through the points in line "B". (See Figure B.) Loosen screw (23) and adjust eccentric nut (24) to get the toggles in this straight line. Again, this is important – take care! Tighten screw (23).

Step 5 – Loosen screw (25) and adjust eccentric nut (26) until the top of the shift key is 1/16" above the bottom row of keys. Tighten screw (25).

Step 6 – You are ready now to adjust the "on feet". Use capital letters for this. Hold the shift key down with your finger. (Do not use the shift lock key.) Adjust eccentric nut (31) to get "on feet". To raise the segment, turn eccentric (31) to the front. To lower the segment, turn eccentric (31) to the rear. You should never have to turn the eccentric more than one-quarter turn either way. When this adjustment is complete, the high side of eccentric (31) should still favor the bottom.

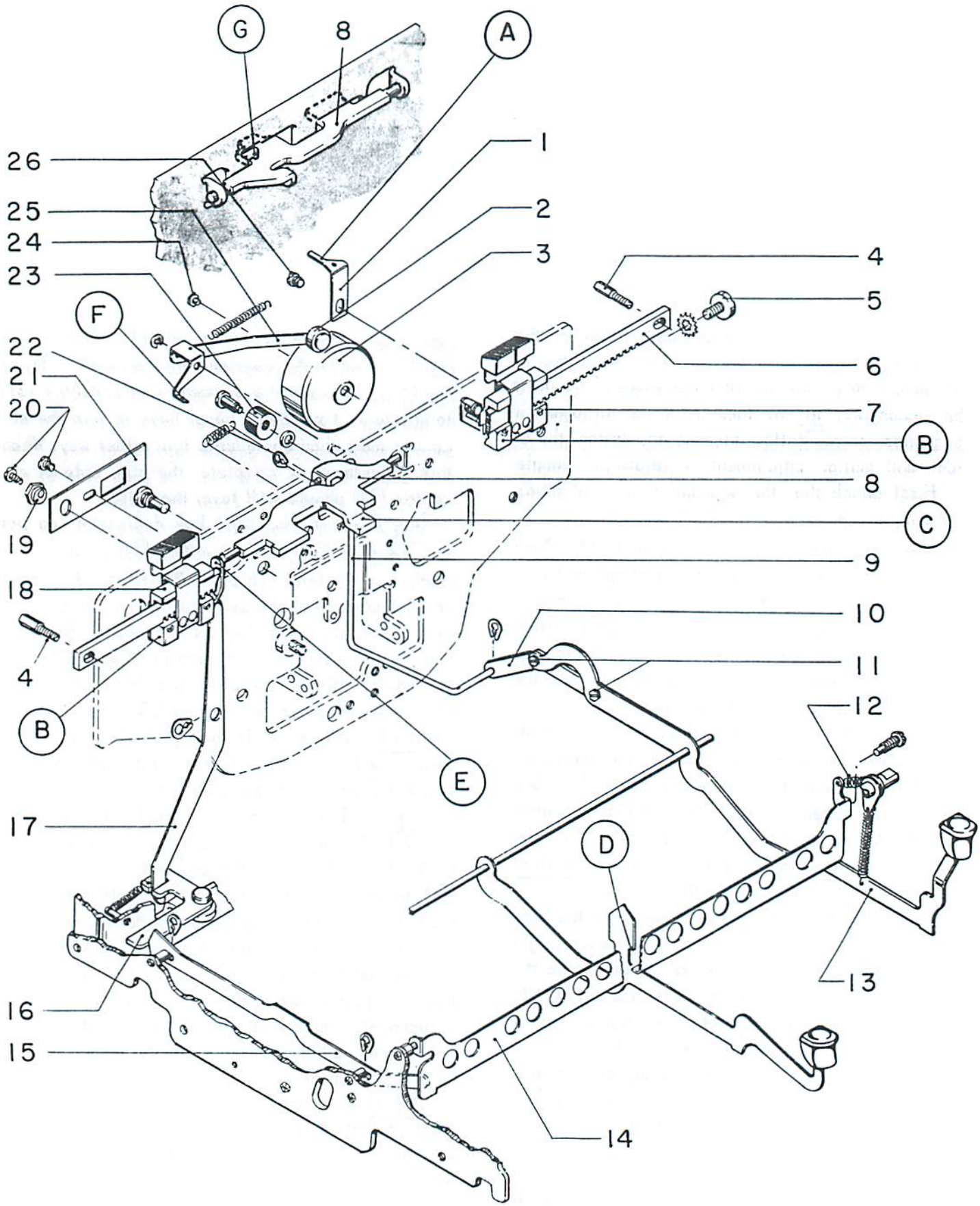
Step 7 – With the shift key depressed (do not use the lock key), adjust screw (33) until it just touches the plate. This is the limit adjustment which insures that the segment has no loose movement when the shift key is depressed. Recheck "on feet" after this adjustment. CAUTION: Do not adjust this screw down too far to limit the segment and destroy the "on feet". Tighten nut (32).

Step 8 – Adjust shift lock plate (28) until the shift lock keys, both left and right, will hold the segment down into proper position.

Step 9 – The motion is adjusted with eccentric nut (21). To raise the segment, turn eccentric (21) to the front. To lower the segment, turn eccentric (21) to the rear. The eccentric should still favor the bottom when this adjustment is completed.

Step 10 – With the shift key, up turn screw (17) until it just touches the plate. The segment should have no loose movement when it is up with this adjustment. Tighten nut (18). After this adjustment, you should not be able to push the segment down by pressing down on the type bar guide.

Step 11 – Adjust the spring tension of the segment so that it will snap up quickly when the shift key is released. To adjust, turn screw (3) clockwise for more tension and counterclockwise for less tension.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Step 1 – There should be about .010 clearance between point "C" of arm (8) and point "B" of both left and right margin stops (7) and (18). To adjust, form arm "G" up or down as needed. Be sure to check this at both the left and the right ends.

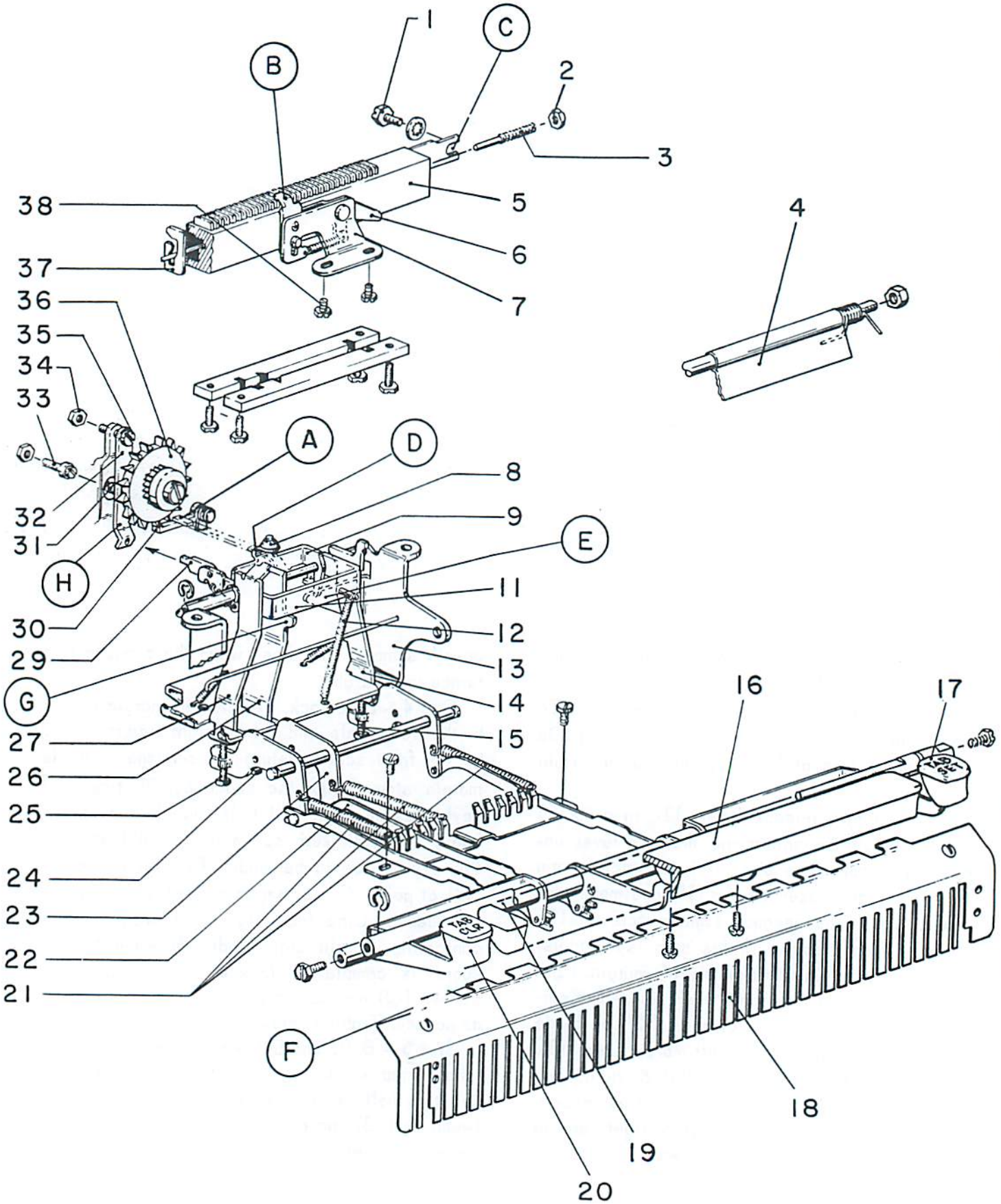
Step 2 – Margin release lever (13), in a normal position, should be contacting the key lever upstop at the same time arm (8) is contacting arm "G". To adjust, loosen screws (11) and move arm (10) up or down as needed. Tighten screws (11).

Step 3 – The purpose of this step is to adjust the over and under banking of the left margin. Position the margin rack (6) until there is .050 clearance between the left edge of point "C" on blade (8) and the right edge of the left margin stop (18). To adjust, loosen screws (4) (left & right) and adjust screws (5) (left & right) in or out as needed. Check that both screws (5) (left & right) are in contact with the edge of rack (6) when the adjustment is completed. Tighten screws (4) (left & right). Adjust rubber buffer (25) to just contact the margin stop release blade in a normal position. This is to absorb some of the shock when the carriage is returned to the right.

Step 4 – Line lock. Set the left margin at "20" by the front scale, and set the right margin at "40" by the front scale. Return the carriage to the left margin stop. Strike the space bar 20 times. The keyboard line lock bail (14) should lock the keyboard after the 20th space and should not allow the 21st space to be made. To adjust, form arm (17) at point "E" either to the left or to the right as needed. Line lock plate (21) should just be contacting margin stop blade (8) when the keyboard is completely locked. To adjust, loosen screws (20) and adjust eccentric (19) left or right as needed. Tighten screws (20).

Step 5 – Bell. The bell should ring with a good, loud, crisp sound. To adjust, loosen screw (24) and turn bell (3) until there is .020 clearance between bell (3) and bell ringer (2). If more throw is needed for bell arm (25), loosen screw (26) and move bracket (1) up. Tighten screw (26) before checking this adjustment.

TABULATOR REMINGTON



NOTE: The escapement, rack, and carriage adjustments should be made prior to this adjustment.

The tabulator, tab set, and tab clear adjustments are all made at the same time. Follow the following (8) steps:

Step 1 – When the tabulator, tab set, and tab clear keys are in a normal position, there should be .010 clearance between adjusting screws (25), (24), and (15) and blades (27), (26), and (14). To adjust, turn adjusting screws (25), (24), and (15) as needed. To check this, lightly tap each key "20", "16", and "17". There should be a small amount of free movement before the blades (27), (26) and (14) start to move.

Step 2 – The positioning of tab rack (5) in the proper left to right position is called the 3/4 drop. A 3/4 drop is the distance that the carriage moves when the tab bar is released after tabulation. To adjust, loosen screws (1) (left & right) just "snug tight". Move rack (5) as far to the left (facing the rear of the machine) as the slots will allow. Set a tab stop at about "30" on the carriage scale. Position the carriage so that it will be set on scale No. 29. Depress the tab bar and the carriage should move about 1/4 space. Release the tab bar and the carriage should move about 3/4 space. Adjust screw (3) in about one-fourth turn. Make this check again. Continue to check until you get this correct "1/4 – 3/4". Tighten screws (1) (left & right) and also lock nut (2).

Step 3 – When the tab blade is held down, there should be a clearance of 1/32" between the top of tab blade (26) and the bottom of all unset tab stops. To adjust, loosen screws (1) (left & right) and move rack (5) up or down as needed. Check this at both left and right ends of the tab rack.

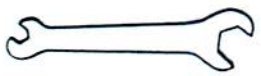
Step 4 – Remove the platen, feed rollers, and paper pan. Position the carriage until you can see bracket (7) in the openings of the carriage frame. Lip "B" should be positioned directly over one and only one tab stop. To adjust, loosen screws (38) and move bracket (7) left or right as needed. Lip "B" should clear all of the unset tab stops with about 1/32" clearance. Form Lip "B" up or down as needed. Use care when forming for it might break.

Step 5 – Arm "A" should be centrally located between loose dog (30) and the teeth of starwheel (36) when the tab bar is in normal position. To adjust, form extension "E" on tab blade comb (13) frontward or rearward as needed.

Step 6 – Depress the tab bar. The friction disc of arm (32) should contact the starwheel fully. It should lay flat against the back of the starwheel. To adjust, loosen lock nut (34) and turn screw (35) in or out as needed.

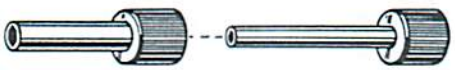
Step 7 – With the tab in a normal position, the friction disc of arm (32) should not contact the back of the starwheel. To adjust, form arm (32) at point "H".

Step 8 – The tab brake should have sufficient tension to govern the speed of the carriage when in tabulation. To adjust the brake, adjust screw (33) in or out as needed.



N0. 25 OPEN END WRENCH

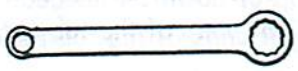
N0. TL-250-3-21 OPEN END WRENCH



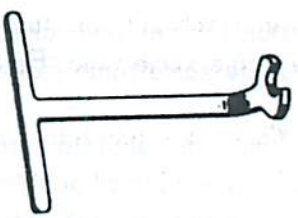
3/16" Dia. 1/8 Dia.

N0. 38 MULTI-USE TRIP SOCKET WRENCH

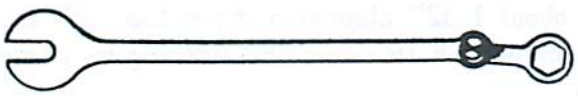
N0. AST-40000 OPEN END WRENCH



N0. AST-40011 BOX WRENCH

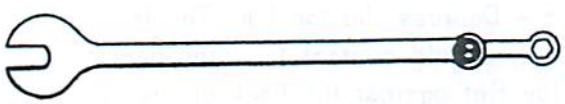


N0. ST-40001 OPEN END WRENCH



N0. ST-40027 TOGGLE WRENCH

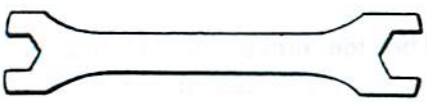
N0. 12-N SOCKET WRENCH



N0. TL-250-12-2 TOGGLE WRENCH

N0. 13-N SOCKET WRENCH

N0. 18-N SOCKET WRENCH



N0. 23 CYLINDER BUSHING WRENCH

N0. 31-N SOCKET WRENCH

NOTES

NOTES

SMITH CORONA INDEX

Illustrations provided through the courtesy of SCM Corporation.

Technical Material written by the author.

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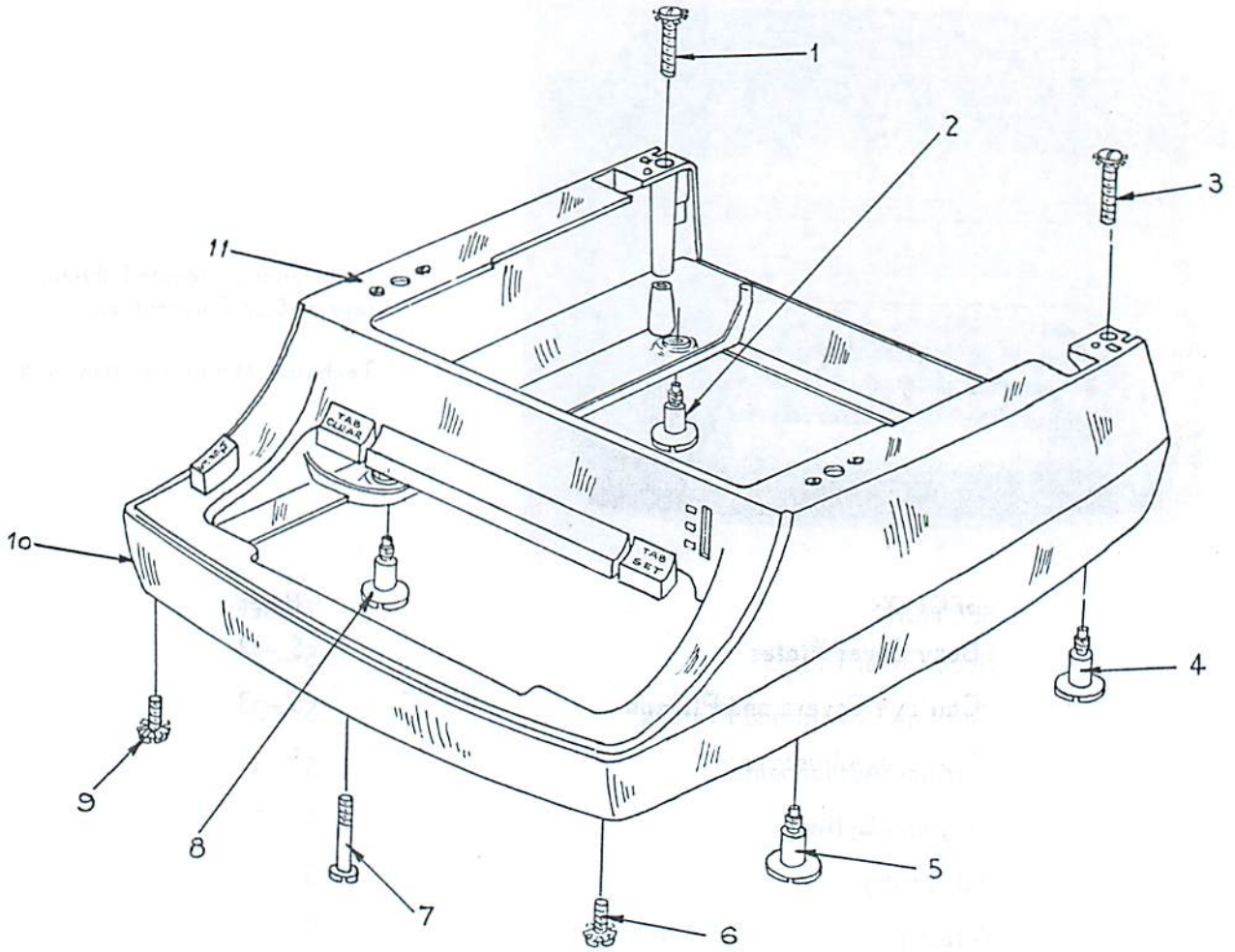
BASE COVER PLATES — SMITH CORONA



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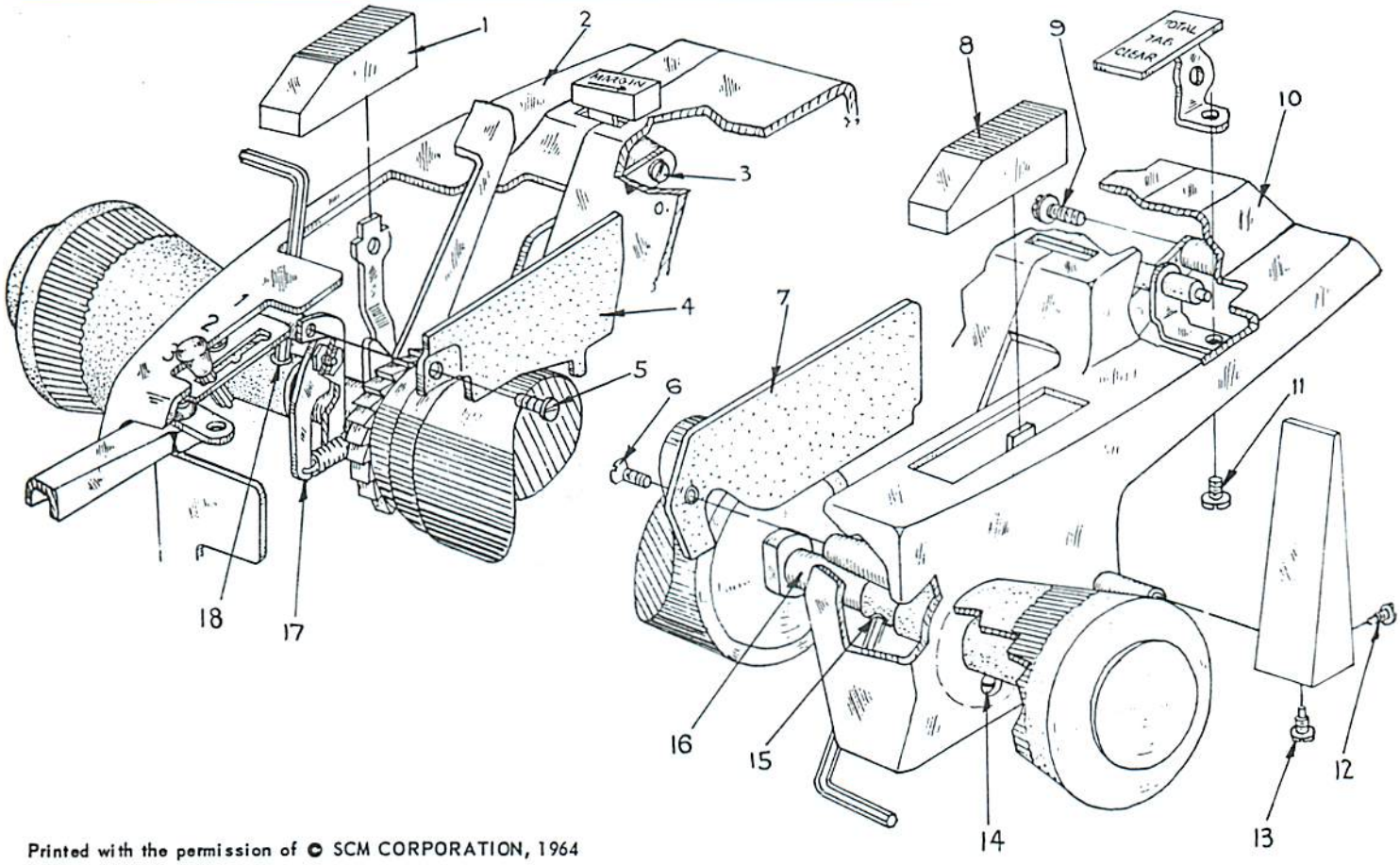
REMOVAL

Remove Top Cover Plate. (Lift up)
Remove Back Cover Plate by removing (2) large Screws on L and R.
Remove Bichrome Lever Knob. (Pull Knob forward and off).
Remove Screws (1) and (3).
Turn Machine on Back.
Remove Screws (6), (7), & (9).
Place Machine on feet.
Depress Tab Bar, Tab Clear, and Tab Set keys.
Lift Cover (11) up slightly and pull forward.
Place front of Machine over edge of desk.
Remove Screws (5) and (8).
Place back of Machine over edge of desk.
Remove Screws (2) and (4).
Lift Machine from Plate (10).

REPLACEMENT

Position Machine into Plate (10).
Place back of Machine over edge of desk.
Replace Screws (2) and (4).
Place front of Machine over edge of desk.
Replace Screws (5) and (8).
Fit Plate (11) into place.
Replace Screws 6, (7), & (9).
Replace Screws (1) and (3). (Do not tighten too tight).
Replace Bichrome Knob.
Replace Back Cover Plate.
Replace Top Cover Plate.

SMITH CORONA CARR. COVERS & PLATENS



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REMOVAL

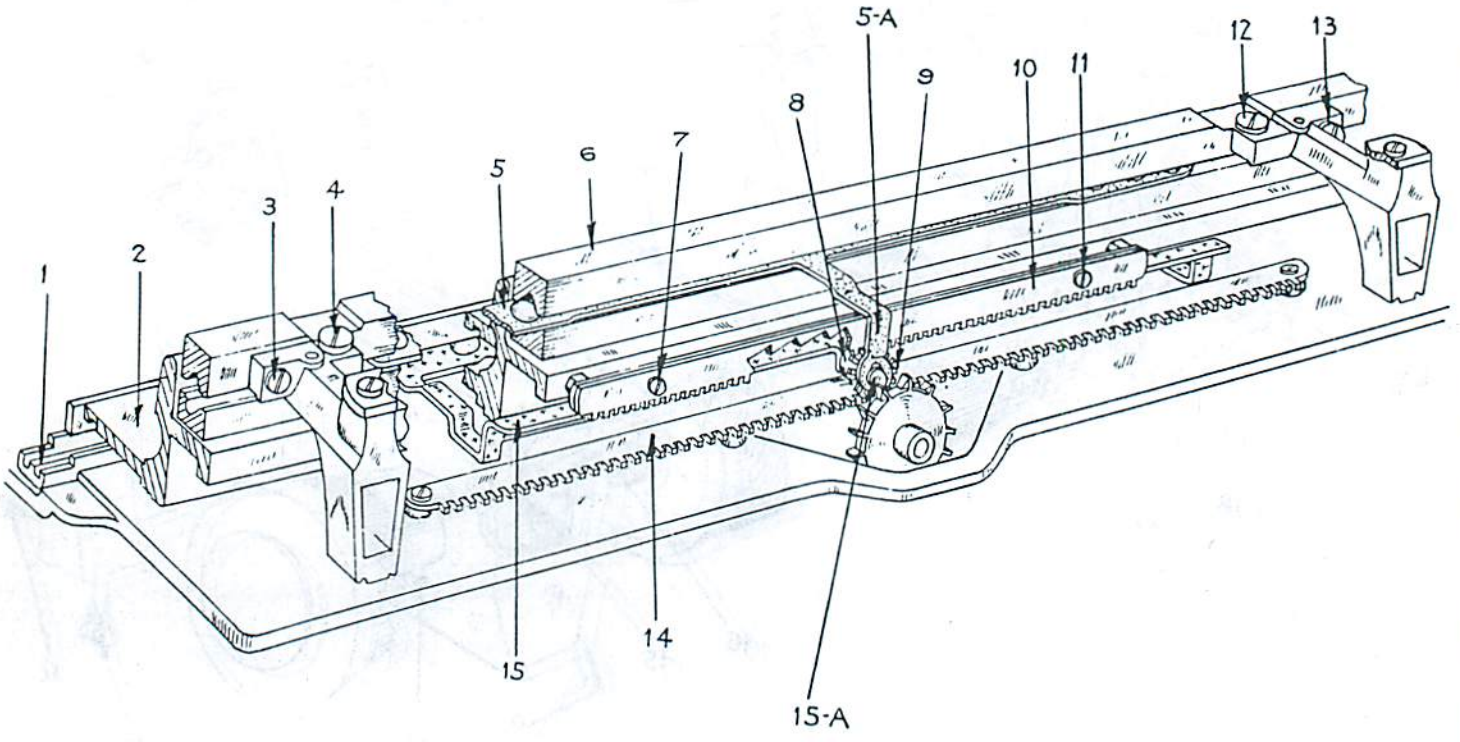
Position Line Space Indicator on (3).
Remove Screw (5).
Remove Plate (4).
Remove Release Button (1). (Pull up).
Loosen Set Screw (18). (5/16" Allen Wrench).
Remove Left Platen Knob.
Remove Screw (3).
Remove Left Carriage Cover.
Remove Screw (6).
Remove Plate (7).
Loosen Set Screw (15).
Remove Right Platen Knob.
Remove Screw (11).
Remove Total Tab Clear Lever.
Remove Screws (12) and (13).
Remove Feed Roll Release Lever.
Remove Release Button (8). (Pull up).
Remove Screws (14) and (9).
Remove Right Carriage Cover.

To Remove Platen, release Latch (17). Lift left *Platen end upward* and slide Platen to left out of Collar (16).

REPLACEMENT

Position Right Platen Shaft into Collar (16).
Clamp Left Platen Shaft into Latch (17).
Replace Right Carriage Cover.
Replace Screws (14) and (9).
Replace Realese Button (8).
Replace Feed Roll Release Lever.
Replace Screws (12) and (13).
Replace Total Tab Clear Lever.
Replace Screw (11).
Replace Right Platen Knob.
Tighten Set Screw (15).
Replace Plate (7).
Replace Screw (6).
Replace Left Carriage Cover.
Replace Screw (3).
Replace Left Platen Knob.
Tighten Set Screw (18).
Replace Release Button (1).
Replace Plate (4).
Replace Screw (5).

CARRIAGE ADJUSTMENTS SMITH CORONA



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REMOVAL

Remove Cover Plates.
Loosen Screws (4) and (12).
Remove Screws (3) and (13).
Remove Upper Ball Race (6).
Slightly raise Carriage and remove Carriage toward the right.

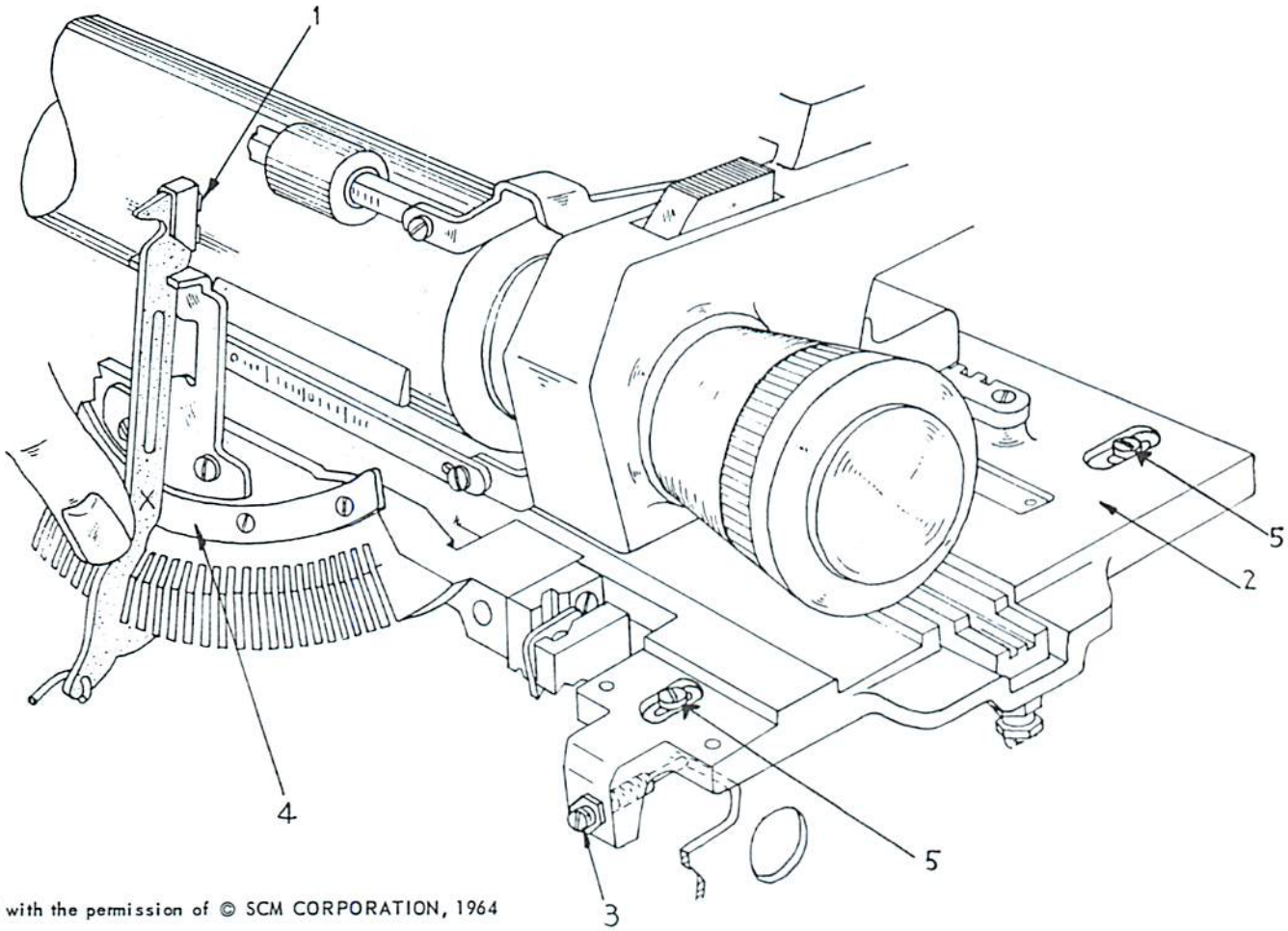
REPLACEMENT

Position lower ball retainer (15) on lower ball race in center of machine base.
Place carriage in center of machine.
Position Upper Ball Retainer (5) so that Arm (5A) is coupled over Stud (15A).
Replace Upper ball race (6).
Install Screws (3) and (13).

The carriage should fit snugly, yet be free of binds. The upper (5) and lower (15) ball retainers should be centered in relationship to the carriage. Rack (10) should mesh as deeply as possible in pinion gear (8), but it should not cause a drag on the carriage.

To center the ball retainers, remove screw (11); raise rack (10) up until gear (9) can be moved to the center of the carriage. Replace rack (10) and screw (11). Adjust rack (10) for proper mesh with gear (9) by loosening screws (7) and (11) and moving rack (10) up or down as needed.

To adjust the carriage, loosen screws (3) and (13) just "snug tight". With upper ball race rail screws (4) and (12), tighten or loosen the upper ball race as needed.



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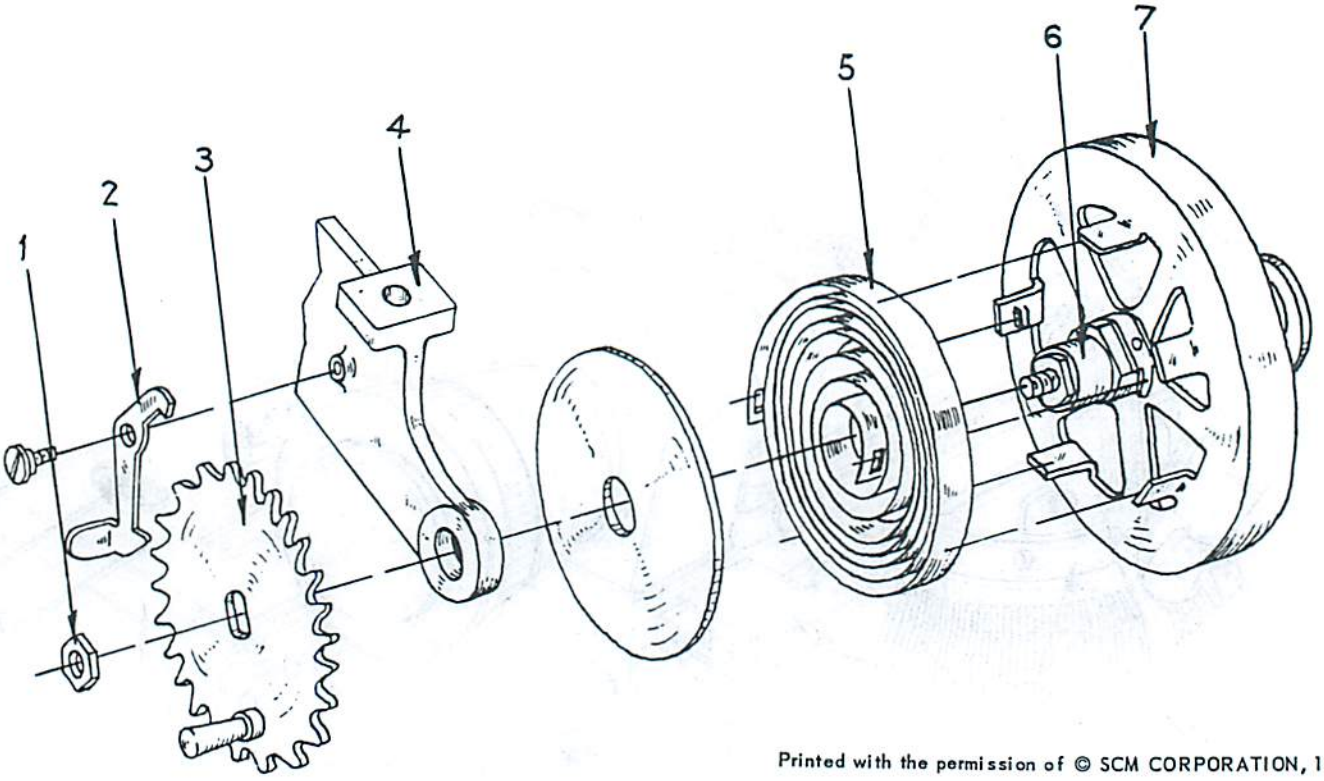
The ring and cylinder adjustment of the Smith Corona is simple, yet very important. The adjustment of the ring and cylinder can affect the trip adjustment, the back spacer, the tabulation, and the margin release adjustment. All of these should be carefully rechecked after making the R & C adjustment.

Before starting the R & C, recheck that the segment is snug, that the platen is locked into place correctly, and that the carriage is in good adjustment.

Loosen slightly screws 5 (2 left, 2 right). Loosen the lock nut on screw (3). Adjust screw (3) in or out as needed. It is important that screw (3) on the left be adjusted the exact same amount as screw (3) on the right. This will keep the base plate parallel with the segment. Tighten screws (5) and the lock nuts on screws (3).



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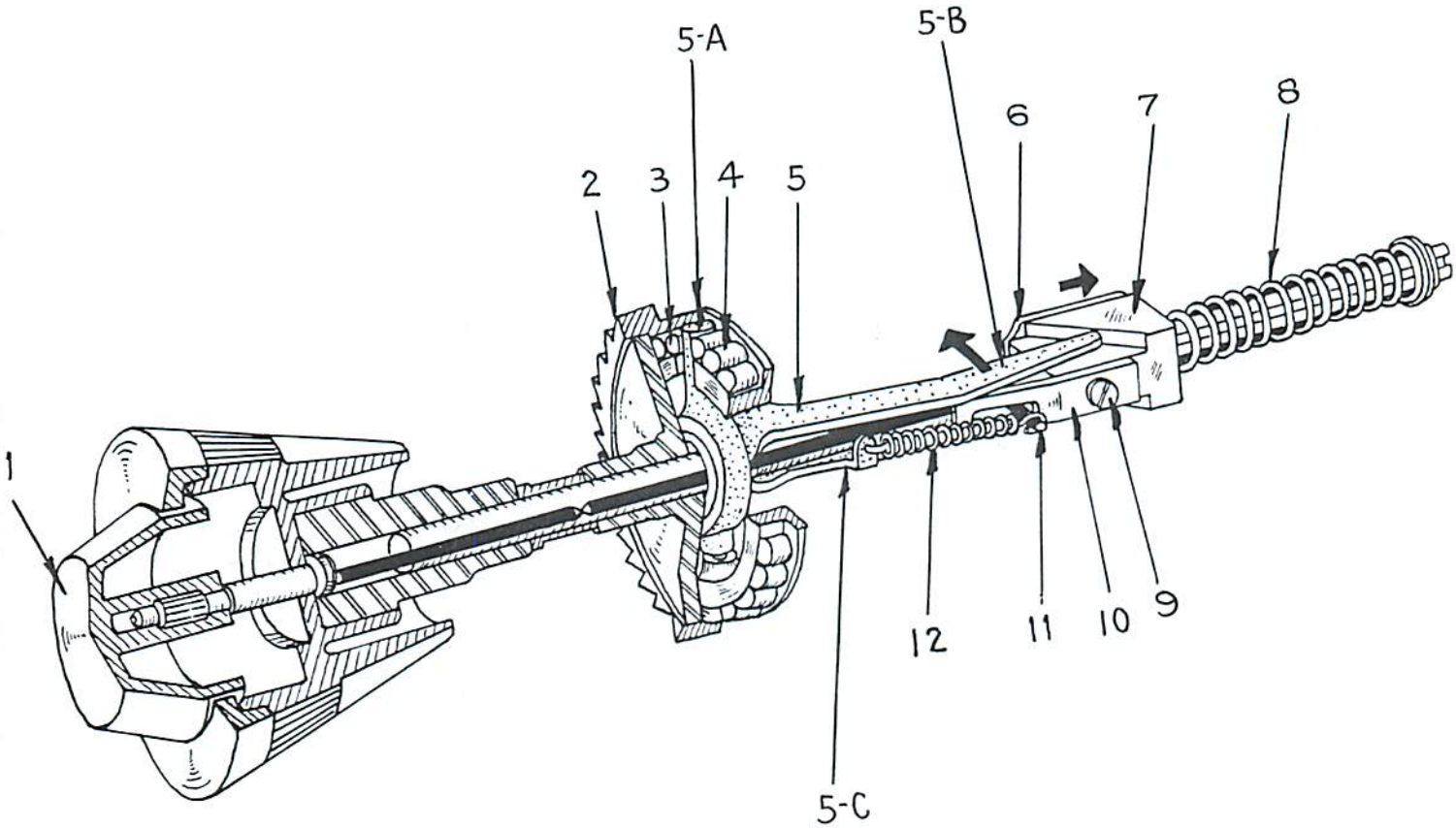
The mainspring tension on the Space-O-Matic 75 should be just a little stronger than on other models. This is to insure that the Space-O-Matic will space all the way across the carriage.

To adjust, loosen lock nut (1) slightly and turn ratchet drum (3) clockwise to increase the tension. To decrease the tension, actuate arm (2) back and forth. Tighten lock nut (1).



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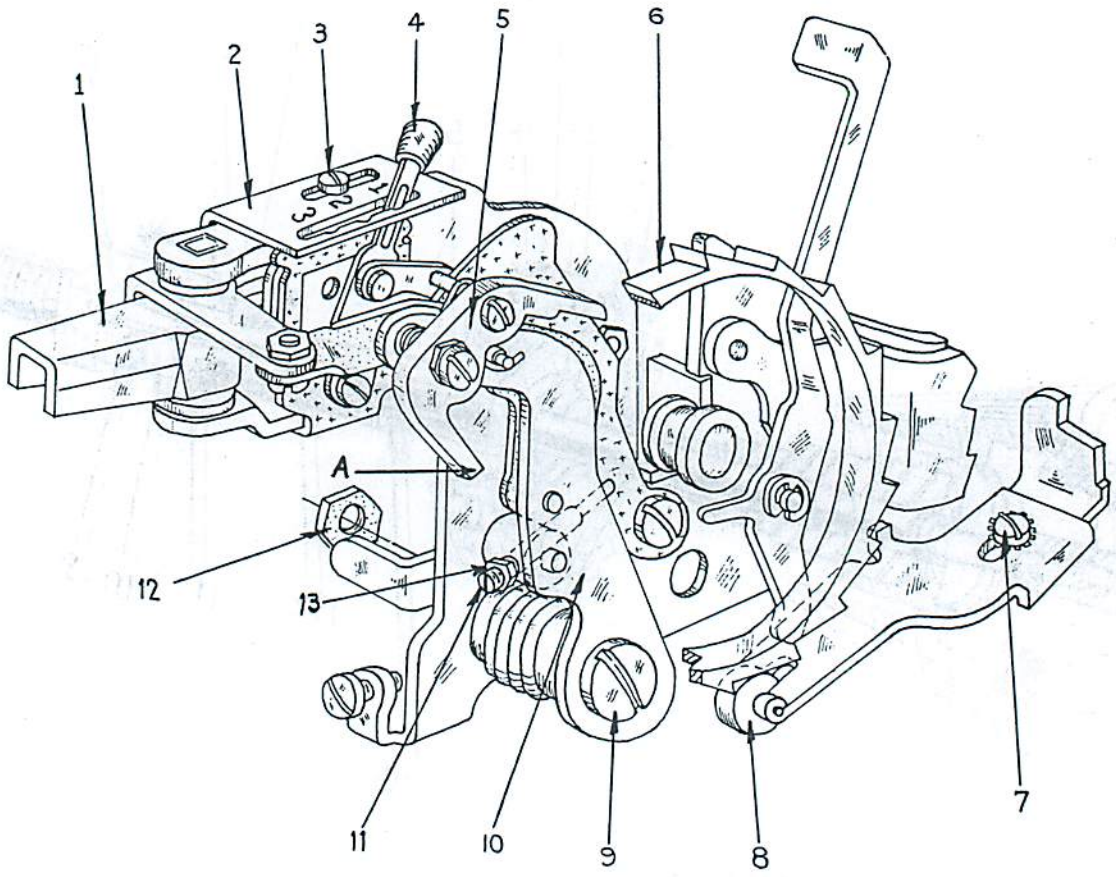
The variable plunger knob (1) must operate freely in and out. Check for binds. Rolls (3) and (4) must be clean of oil and grit. Clutch roll shims (3) vary in size from .091 to .105. This variance controls the amount of rotation of locking cam fork (5).

Adjusting plate (10) should be positioned until the slot in plate (10) does not contact plunger (11) when knob (1) is at rest position. To adjust, loosen screw (9) and adjust plate (10) as needed.



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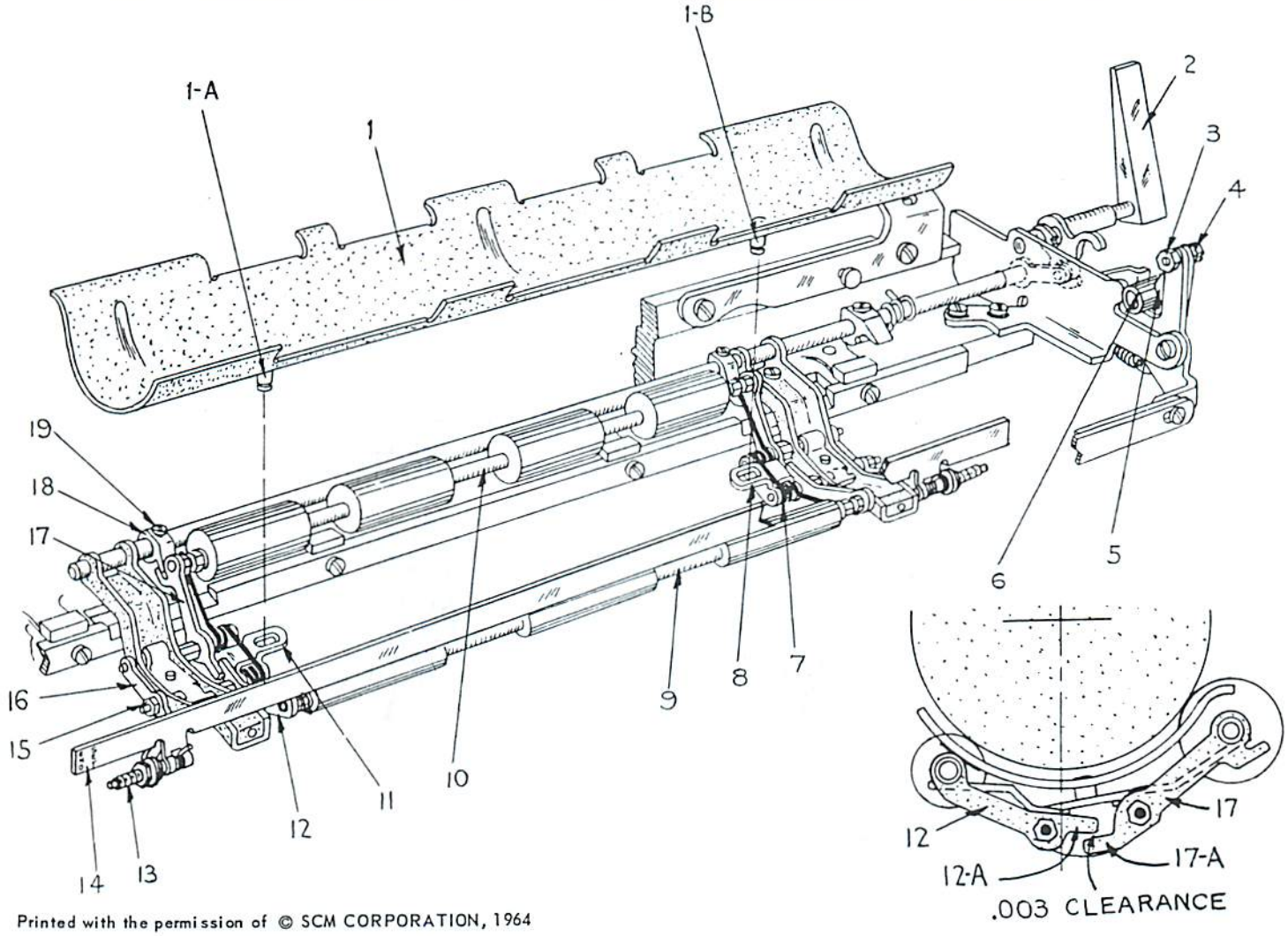
Check all the parts of the line space mechanism for bind freedom. The roll (8) should be in good condition and free on its shaft. Check the teeth of platen ratchet (6).

Step 1 – The line space bell crank (10) should have a minimum of end play. To adjust, loosen nut (12) and adjust screw (9) as needed. Tighten nut (12).

Step 2 – When the line space lever is pulled all the way to the right and held in this position, the heel of pawl (5) at point "A" should be in full contact with ratchet (6). To adjust, loosen screw (7), loosen lock nut (13), and adjust screw (11) as needed. Tighten lock nut (13).

Step 3 – NOTE: Condition s in STEP 2 apply to STEP 3. Detent roll (8) should be positioned between the (2) ratchet teeth (6). To adjust, position roll (8) between the ratchet teeth. Tighten screw (7).

Step 4 – The line space indicator (2) should be positioned so that pawl (5) will contact the proper tooth when the line space lever is activated. To adjust, loosen screw (3) and position plate (2) as needed.



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Step 1 – The platen should be positioned snugly in the platen bearings. To adjust, loosen lock nuts (3) and position adjustable collars (4) until there is no up and down movement of the platen. Tighten lock nuts (3).

Step 2 – The front (9) and rear (10) shafts should have slight end play. To adjust, form front (12) and back (17) arms either left or right as needed.

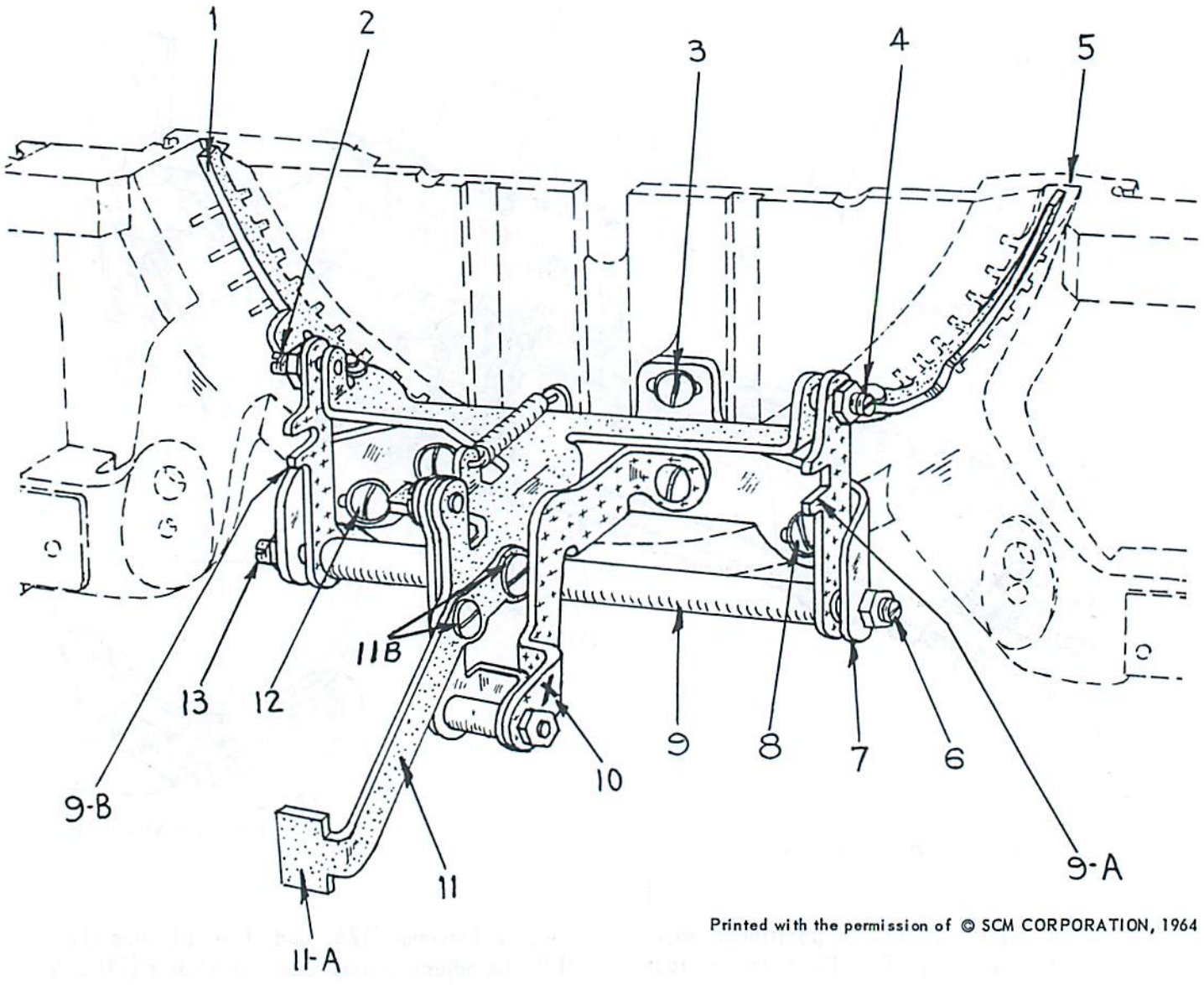
Step 3 – The paper pan (1) should not contact the feed rolls at any point. It should not be bent or formed out of shape. Usually, when a paper pan is out of shape, it is best to replace it with a new one. When trying to form it back into shape, you can increase your problem. To adjust the paper pan for alignment with the feed rolls, form locators (8) and (11) as needed.

Step 4 – With the platen installed and the feed roll release lever back, there should be .003 clearance between (12A) and (17A) of arms (12) and (17). To adjust, loosen cam set screws (19) L & R. Form the front extension of arm (17) at point (17A) up or down as needed.

Step 5 – There should be slight free travel of the release lever before the arms (17) and (12)start to move. To adjust, loosen screws (19) L & R and position cams (18) L & R until there is a slight clearance between cams (18) and arms (17) L & R. Tighten set screws (19).

Step 6 – There should be equal tension on both sides of the rear feed rolls. To adjust, form the rear extension of the pressure roll spring (7) as close to the coil as possible.

Step 7 – There should be equal tension on both sides of the front feed rolls. To adjust, form the front extension of the pressure roll spring (7) as close to the coil as possible.



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As the following adjustments are made, the U bar should be continually checked for freedom.

Step 1 – The rocker (9) should have slight end play. To adjust, turn screws (6) and (13) as needed.

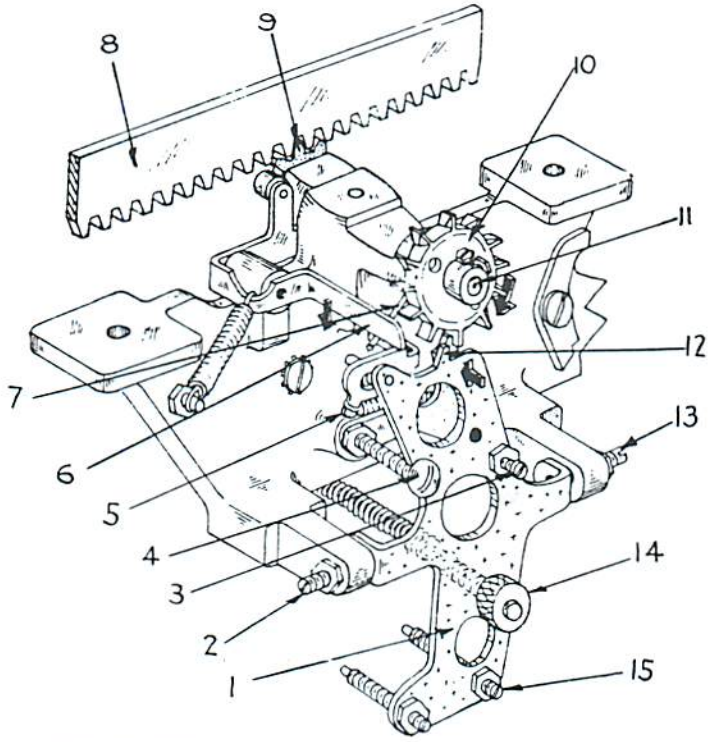
Step 2 – The U bar should have slight end play. To adjust, turn screws (2) and (4) as needed.

Step 3 – The U bar should be centered in segment groove (5). To adjust, position the complete bracket by loosening screws (3), (8), and (12) and moving the bracket as needed. Tighten screws (3), (8), and (12).

Step 4 – The type bars on the left side and on the right side should contact the U bar at the same time. To adjust, open or close the slots at (9A) or (9B). Do not over-form these slots, as the U bar will move out of the center of the segment groove.

Step 5 – Note: Step 4 must be completed. The center type bar should contact the U bar at the same time that the left and right type bars contact the U bar. To adjust, form bracket (10) at point X up for later contact or down for earlier contact.

Step 6 – All type bars should contact at the same point with the segment up or down. To adjust, loosen screws (11B) and position arm (11) up or down as needed.



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NOTE: REVIEW ESCAPEMENT IN GENERAL INFORMATION SECTION

The following steps are to be followed in sequence when adjusting the escapement of the Smith Corona typewriter:

Step 1 – The starwheel (10) and the pinion (9) must be free with a maximum of .004 end play. To adjust, loosen the screws of the starwheel (10) and position the starwheel on shaft (11) as needed.

Step 2 – 6:00 o'clock Adjustment. With the starwheel (10) resting against the loose dog (neutral position), the bottom tooth of the starwheel should be at a 6:00 o'clock position, to adjust, position rocker (1) left or right by adjusting screws (2) and (13) in or out as needed. After making this adjustment, check that rocker (1) is snug between screws (2) and (13), but is not binding.

Step 3 – Front Limit Adjustment. Rocker (1) should be positioned in a neutral position with a *.005 clearance* between the front of rigid dog (12) and the rear of the starwheel (10). To adjust, turn screw (4) in or out as needed.

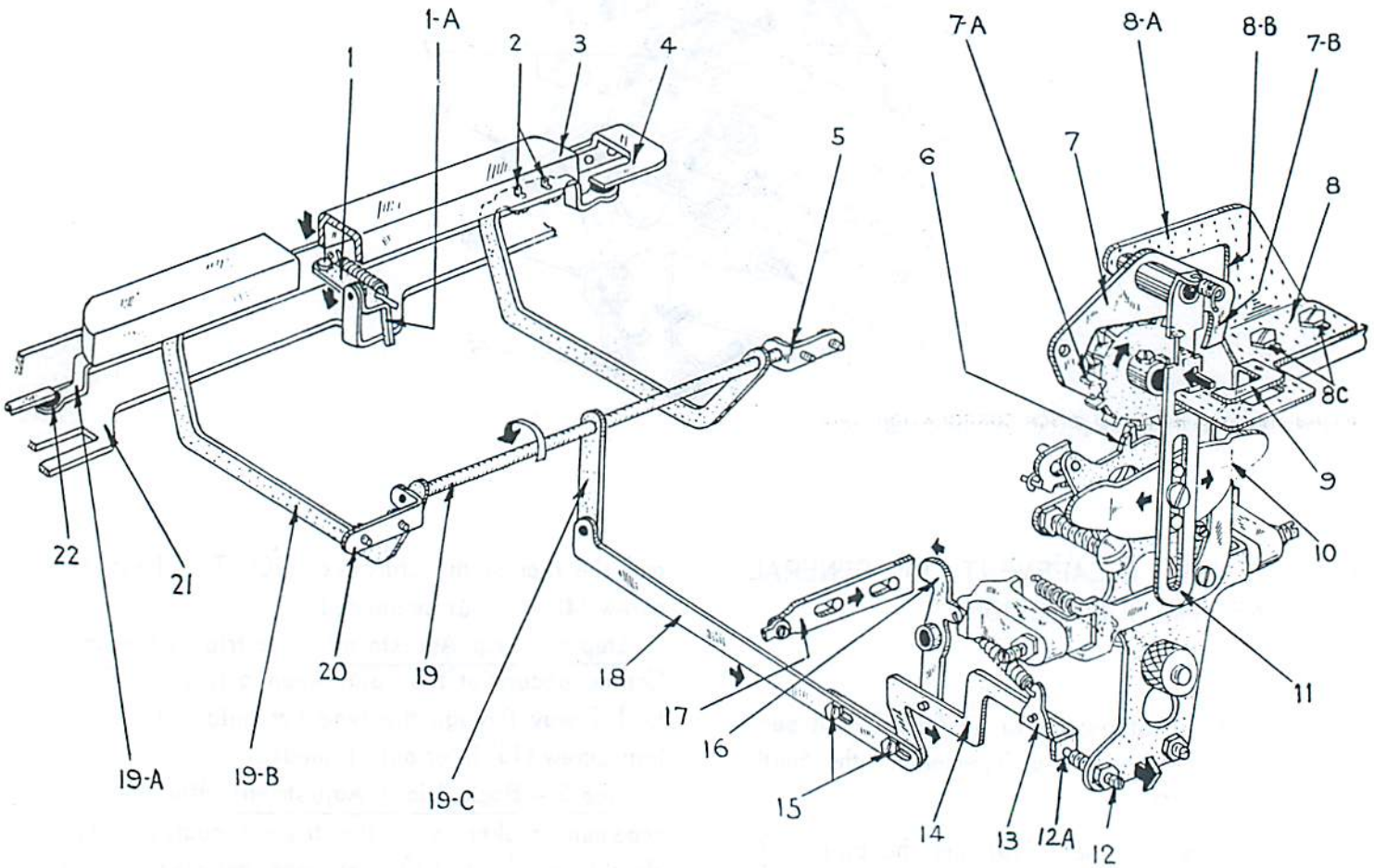
Step 4 – Trip Adjustment. The trip of the Smith Corona occurs at the point when a type bar is 1/4 to 1/2 way through the type bar guide. To adjust, turn screw (15) in or out at needed.

Step 5 – Back Limit Adjustment. When the escapement rocker is in the tripped position, there should be about .010 clearance between the rear edge of rigid dog (12) and the front edge of starwheel tooth (10). To adjust, turn screw (3) in or out as needed.

Step 6 – The rocker spring tension should be sufficient to return the rocker after being tripped. To adjust, turn nut (14) in or out as needed.

Step 7 – In a neutral position, there should be a slight clearance between arm (6) and plate (5). To adjust, form arm (6) up or down as needed.

Step 8 – When the carriage is *returned to the* right, the loose dog should be pushed completely out of the path of the starwheel teeth. Form spring (7) as needed, to adjust.



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NOTE: All Escapement adjustments must be correct before the space bar is adjusted.

The space bar mechanism is composed of three operations. Check out all three. The first operation is the regular "one space" space bar action. The second is the space-o-matic or continuous spacing action. (The space bar is depressed with more pressure). The third is the one-half space action which occurs when the space bar or the "½ space" key is held down into the tripped position.

Step 1 – When the space bar (3) is fully depressed, the space bar bumpers (22) should contact frame (21). To adjust, form arms (19A) as needed.

Step 2 – Space bar (3) should rest at about 1/32" below the bottom row of keys. To adjust, form upstop (4) up or down as needed.

Step 3 – The front edge of plate (8) (as 8B) should be in line with the front edge of the starwheel tooth. To adjust, loosen screws (8C) and adjust plate (8) forward or rearward as needed.

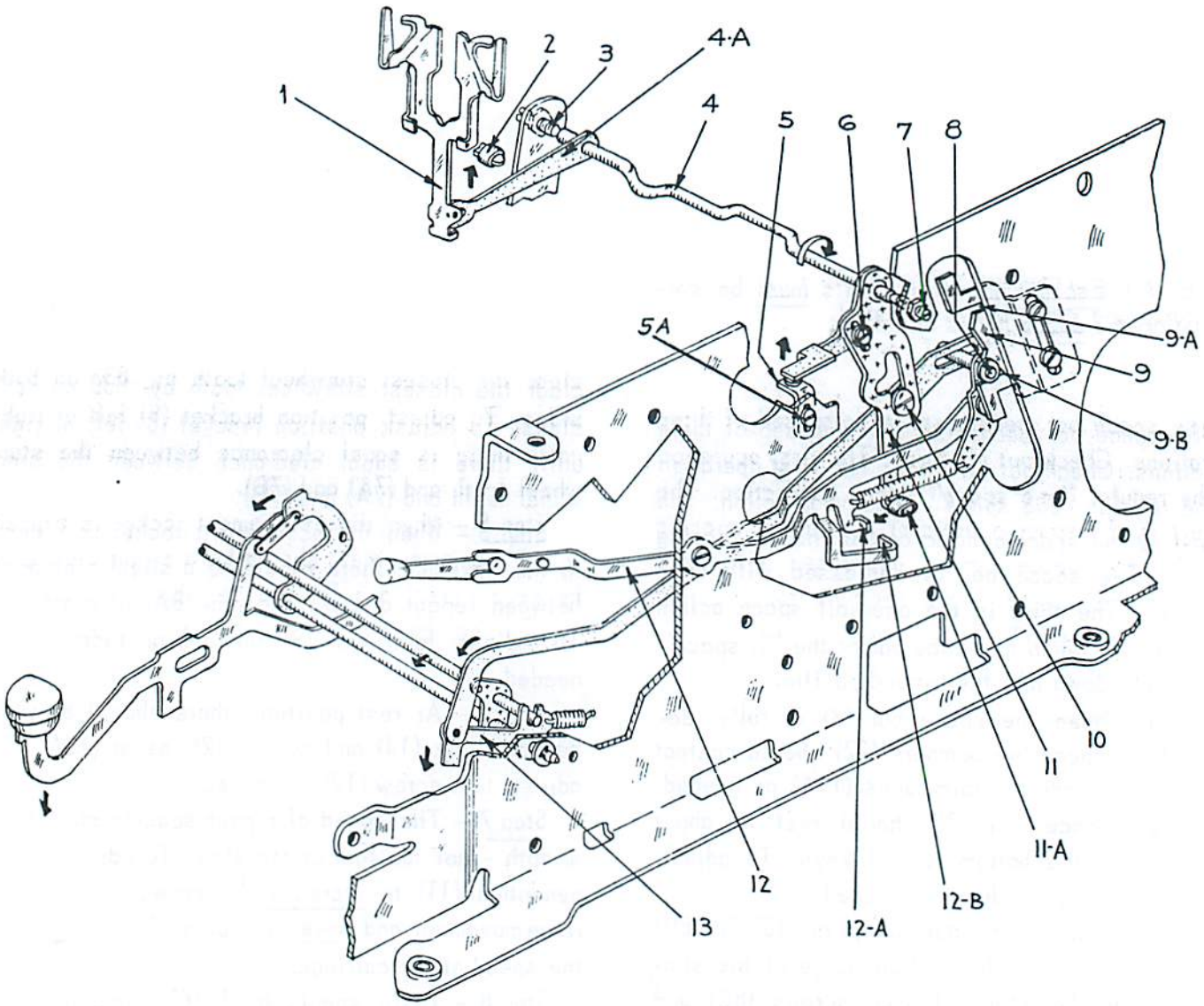
Step 4 – Hold the space bar down in the tripped position. Hold pendulum (11) in a vertical position. Repeat dogs (7A) and (7B) of arm (7) should clear the closest starwheel tooth by .030 on both sides. To adjust, position bracket (8) left or right until there is equal clearance between the starwheel teeth and (7A) and (7B).

Step 5 – When the escapement rocker is tripped to the maximum, there should be a slight clearance between repeat dog (7) and arm (8A) of plate (8). To adjust, form arm (9) forward or rearward as needed.

Step 6 – At rest position, there should be .020 between link (14) and screw (12), as at (12A). To adjust, turn screw (12) as needed.

Step 7 – The speed of repeat spacing should be smooth – not too fast or too slow. To adjust, raise pendulum (11) to increase the speed of the carriage movement and lower pendulum (11) to decrease the speed of the carriage.

Step 8 – There should be 1/16" clearance between space bar (3) and space bar repeat stop (1) when the space bar is held down into a single space operation. To adjust, form arm (1A) up or down as needed.



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The bichrome should be free of binds. Check that vibrator (1) is free.

There are three adjustments of the Smith Corona bichrome; 1. Rest position adjustment 2. Throw adjustment 3. Upstop or bleeding adjustments.

Step 1 – Arm (4A) should be centered on vibrator (1). To adjust, position pivot screws (3) and (7).

Step 2 – With the bichrome lever in the stencil position, screw (10) should be in the slot opening in plate (11). Also stud (8) should be in the center notch of plate (9). To adjust, position plate (9) up or down as needed.

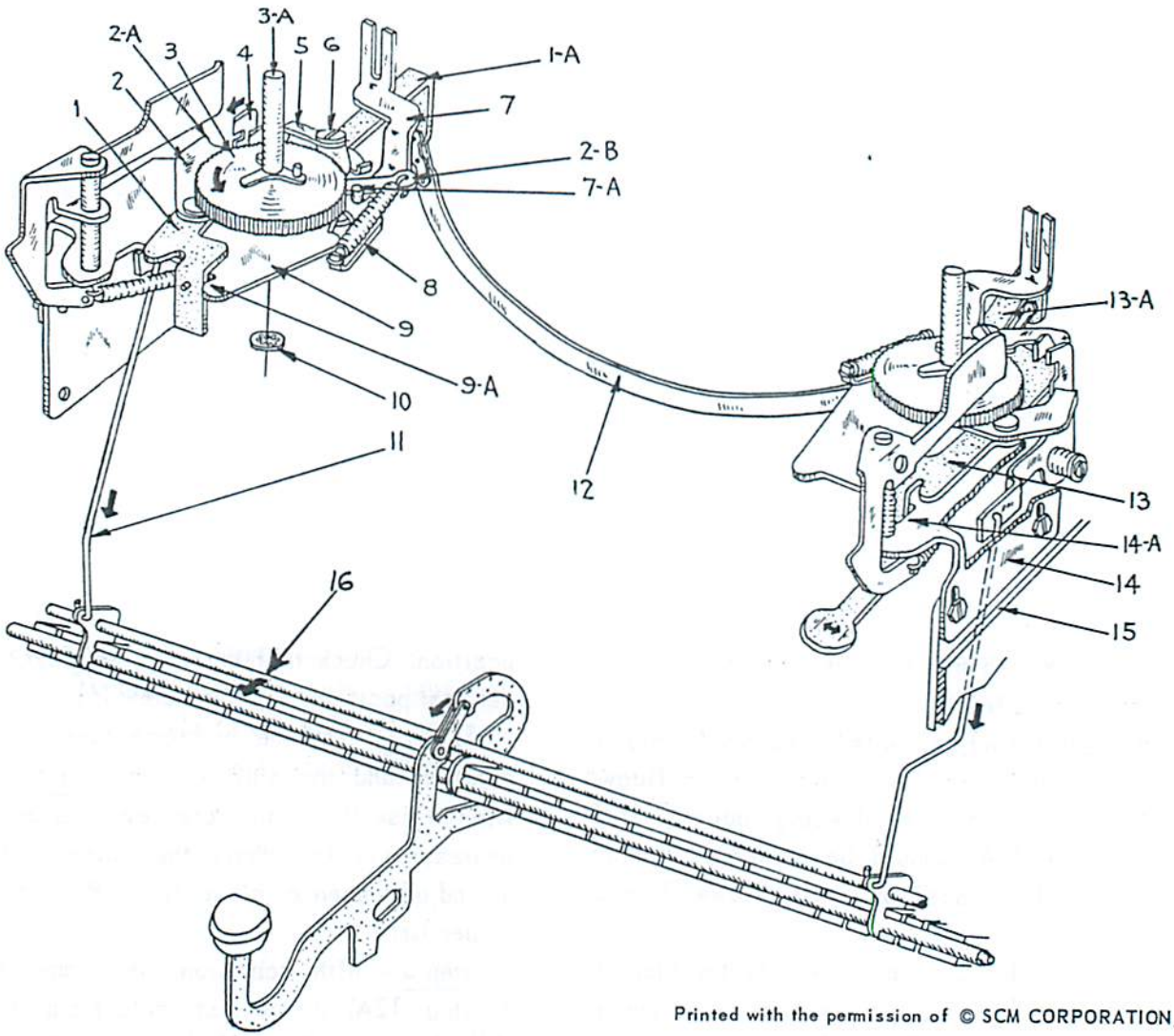
Step 3 – With the segment shifted to capital letters and the bichrome lever in the stencil position, the underscore key should contact the platen just slightly above the top of the ribbon. To adjust, loosen screw (6), loosen screw (5A), and position bracket (5) up or down as needed. Tighten screw (5A). Place the bichrome lever in the black position. Check that the vibrator stays in the proper rest position. Tighten screw (6).

Step 4 – With the bichrome lever in the black position and the shift in the capital letter position, raise the underscore key. It should make an impression 1/16" above the center of the ribbon. To adjust, open or close slot (9B) of plate (9) for proper lift.

Step 5 – With conditions the same as in Step 4, stop (12A) should just contact ear (11A) of arm (11). To adjust, form (12A) as needed.

Step 6 – With the bichrome lever in the red position and the shift in the capital letter position, raise the underscore key. It should make an impression 1/32" above the bottom of the ribbon. To adjust, open or close slot (9A) of plate (9) for proper lift.

Step 7 – With conditions the same as in Step 6, stop (12B) should just contact ear (11A) of arm (11). To adjust, form (12B) as needed.



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The ribbon feed of the "75" is motivated by the rotation of the ribbon universal (16). This pulls down link (11) which causes pawl (4) to turn gear (3). Pawl (5) is a check pawl and keeps gear (3) from turning backward when that particular spool is being rotated.

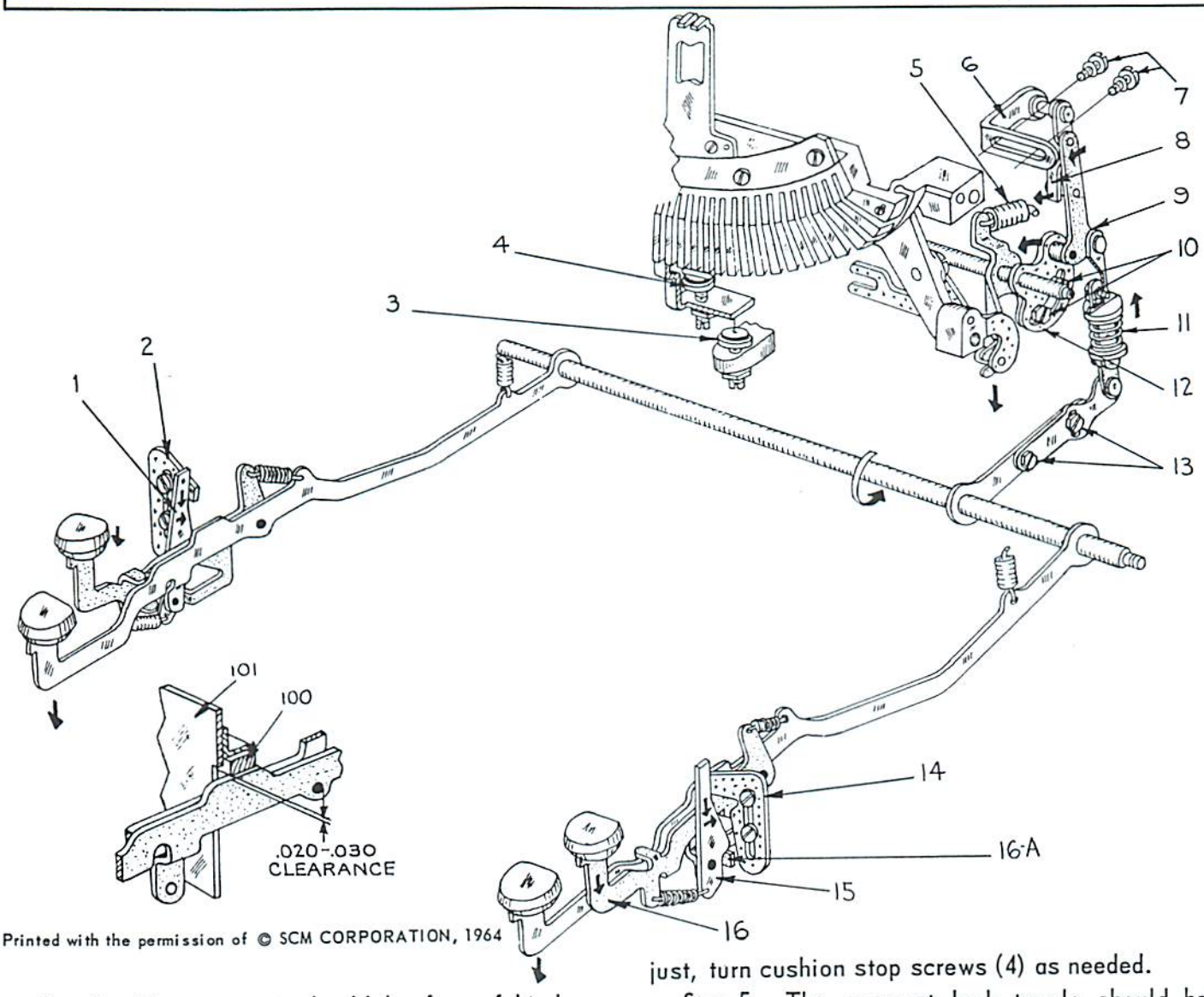
The ribbon reverse of the Smith Corona 75 is accomplished with the eyelet in the ribbon. The eyelet contacts arm (7) causing arm (2) to get into the path of pawl (4). As pawl (4) tries to feed gear (3), the pressure will cause a toggle spring (located at 9A) to trip arm (12), either left or right, allowing the opposite empty spool to begin to feed.

Step 1 – Check all points for freedom. Check pawls (4). They must not be worn, and they must be in good contact with gear (3) when a type bar is held up to the platen. Check the condition of the springs. Check the two reverse toggles springs on the left and right sides.

Step 2 – When the front of arm (1) is contacting the inside edge of plate (9A), arm (13) should be contacting the outside edge of (14A). To adjust, form brackets (13A) or (1A) as needed.

Step 3 – Bring a type bar slowly up to the platen. Watch and be sure that feed pawl (4) is contacting the second tooth from the detent pawl (5) and that pawl (4) is contacting gear (3) squarely. To adjust, form arm (4) as needed.

Step 4 – Left and right reversing action must be completed before the type bar enters the type guide. With the feed action at the rest position, there must be a .015 minimum clearance between pawl (4) and arm (2), as between (4A) and (2A) (see inset). To adjust, form link (11) at its offset point as needed.



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Step 1 – The segment should be free of binds, yet snug in the brackets. Check for binds in the shift links. Shift toggle link (9) should be free and should pivot back and forth easily. To adjust for freedom, loosen screws (7) and move bracket (6) as needed.

Step 2 – The "on feet" adjustment of the Smith Corona will use the capital letters. Depress the shift key and type lightly with a number of different keys. They should print evenly top to bottom. To adjust, turn cushion stop screw (3) as needed.

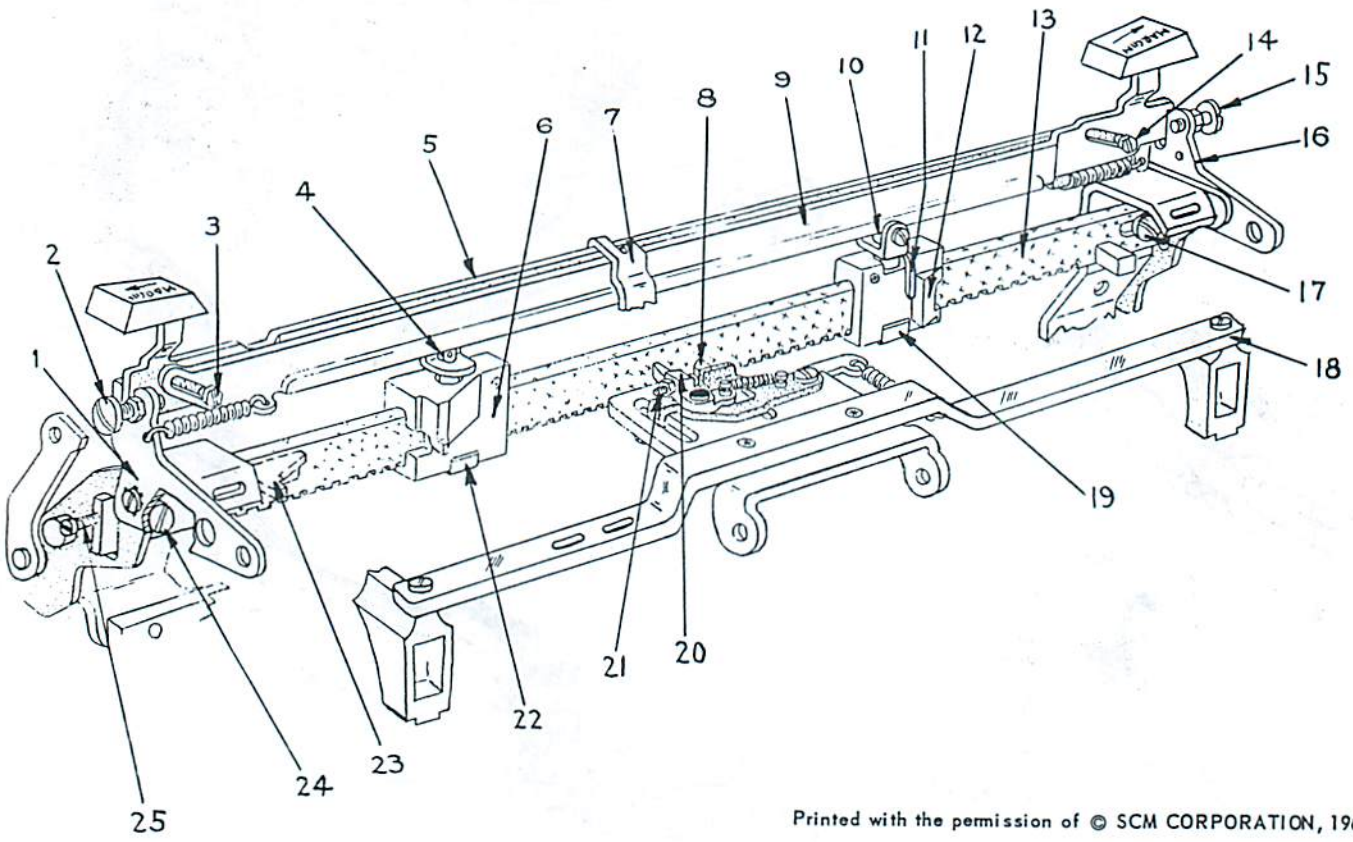
Step 3 – Shift spring (5) should hold the segment up against the cushion stop (4) when the shift key is released. To adjust, loosen screw (10) and adjust the spring adjusting nut for more or less tension. (Do not tighten screws 10).

Step 4 – The motion is adjusted by aligning the small letters with the capital letters. To adjust, turn cushion stop screws (4) as needed.

Step 5 – The segment lock toggle should hold the segment in a locked position (up) so that it has no up and down movement when you check by pushing up and down on the type bar guide. To adjust, loosen screws (13). Apply pressure on on shift arm (12) (to the rear); tighten screws (10); release pressure. Hold the shift keylever down about .020 – .030 from keylever cushion (100) (see inset). Tighten screws (13). Recheck the motion adjustment.

NOTE: If the segment is not locked, form arm (8) forward. Recheck the adjustments in Step 5. If the segment is locked too tight, form arm (8) backward. Recheck the adjustments in Step 5.

Step 6 – Shift lock levers (16) should hold the segment down into a locked position. To adjust, loosen screws and adjust plates (2) and (14) up or down as needed.



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NOTE: All Escapement adjustments must be correct before adjusting the Margins.

Step 1 – The margin release bars (5) and (9) should be centered on rolls (4) and (10). There should be a clearance of about .010 between rolls (4) and (10) and release bars (5) and (9). To adjust, position rack (13) down as far as possible. Also position bars (5) and (9) over rolls (4) and (10) by forming or positioning plates (1) and (16).

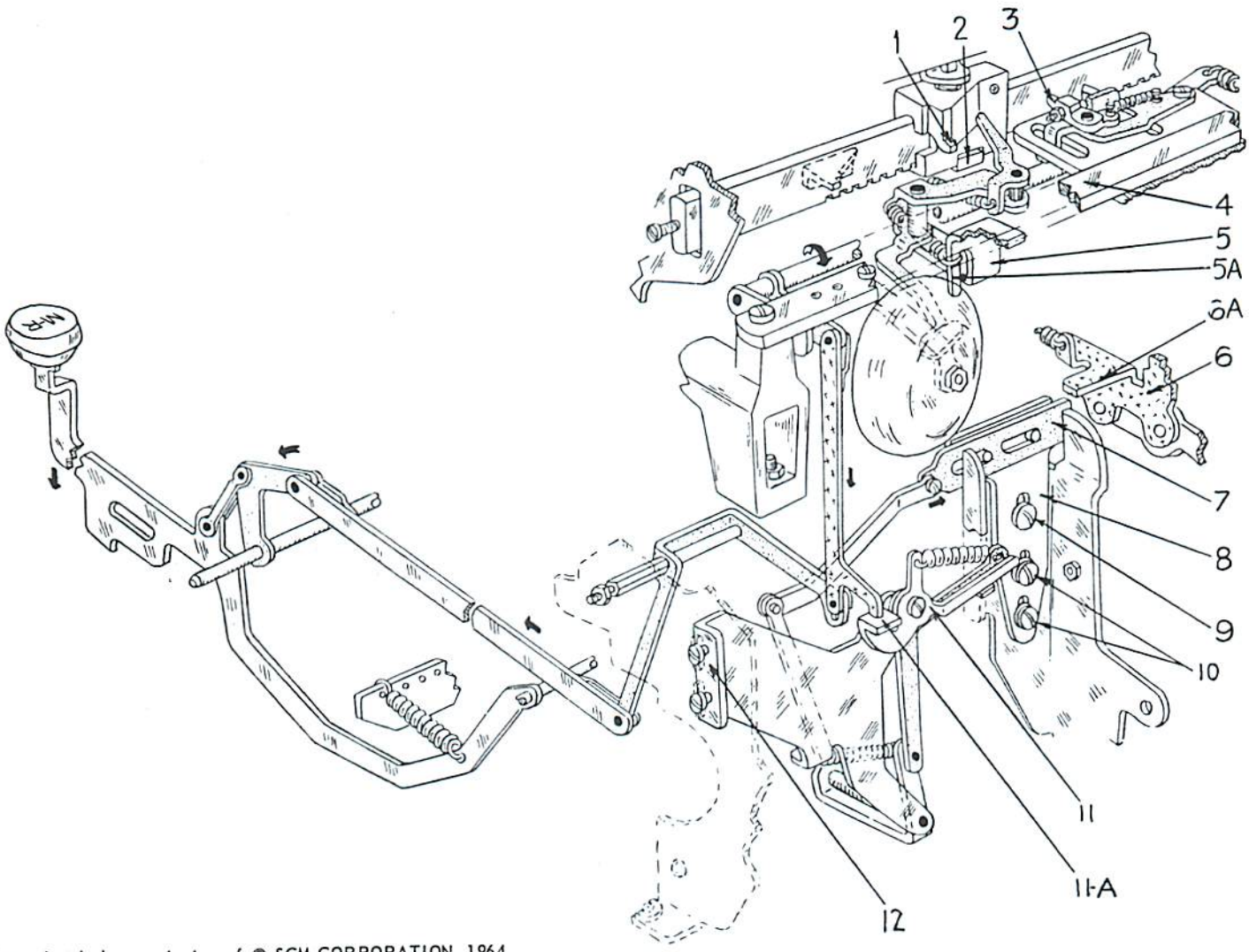
Step 2 – There should be a slight additional downward movement of locators (19) and (22) when release bars (5) and (9) are in contact with adjusting screws (2) and (15). To adjust, turn screws (2) and (15) as needed.

Step 3 – The carriage stop (8) should have a 50% bite on the left margin stop (12). To adjust, face the machine from the rear and move the right end of support (18) forward and rearward.

Step 4 – Place the carriage in the "zero" position of the paper table and the paper bail. Depress the left margin release key, then release this key very slowly. The teeth (19) of the left margin stop should line up perfectly with the teeth of rack (13). To adjust, loosen screws (17) and (24) slightly and move rack (13) left or right as needed, using adjusting screw (25).

Step 5 – The right margin teeth (22) should line up in the same manner as the left margin stop in Step 4. To adjust, turn screw (21) in or out as needed.

SMITH CORONA **LINE LOCK, MAR. REL.&BELL**



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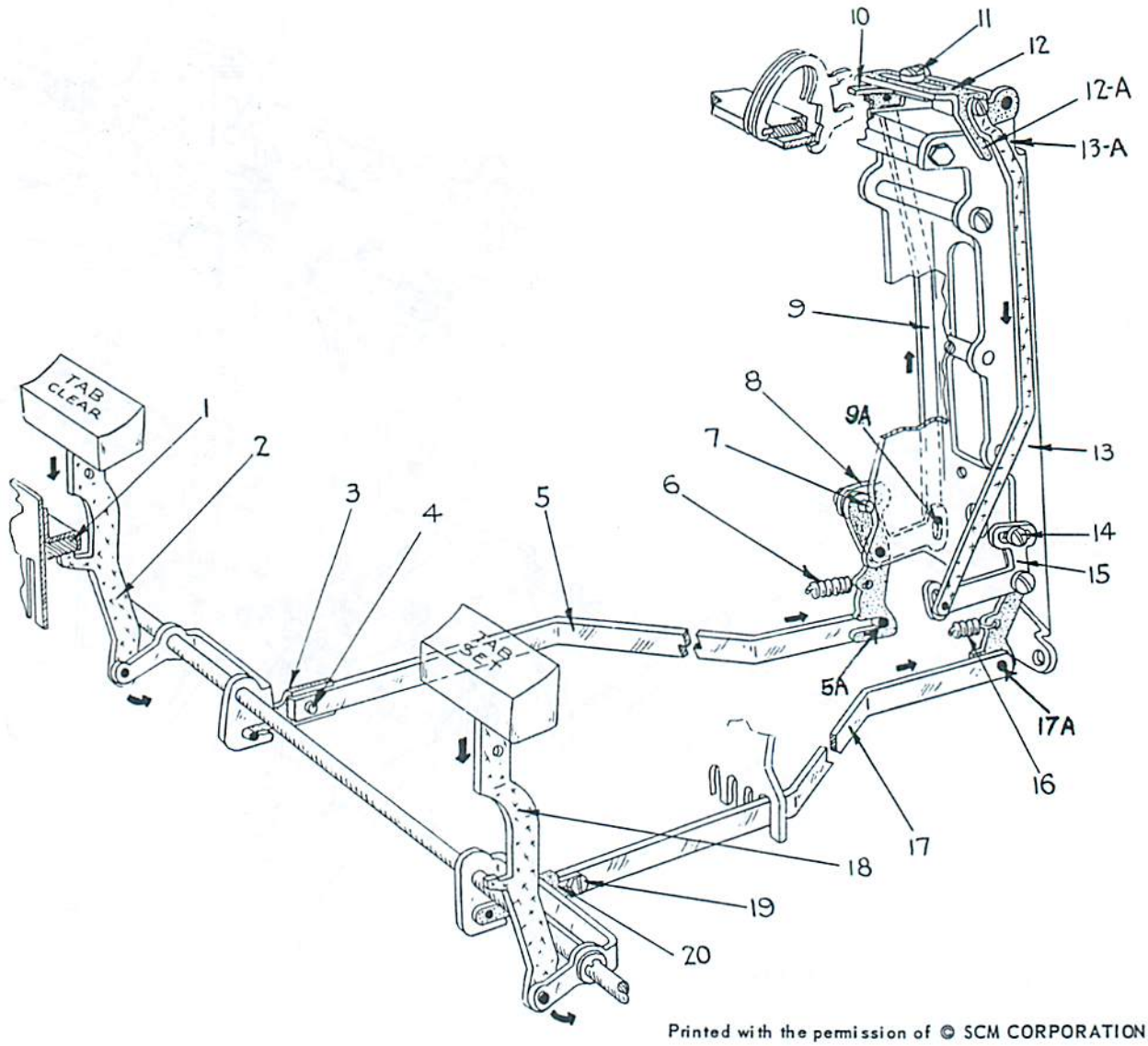
The line lock and the margin release are adjusted as one unit. Both are covered with the following steps. Check that all parts are bind-free.

Step 1 – There should be .010 clearance between line lock (7) and ear (6A) when the mechanism is in a neutral position. To adjust, loosen the lock nut behind screw (9) and position plate (8) as needed. Tighten the lock nut on screw (9).

Step 2 – Position the right margin stop at the the extreme right end of the margin rack. Use the space bar and space the carriage until the line lock mechanism sets up. The flat surface of (1) should be in contact then with carriage stop (3). Line lock (7) should block the escapement and space bar. To adjust, raise or lower bracket (12) or form ear (11A) up or down as needed.

Step 3 – The bell should ring six to eight spaces before the line lock is in position. To adjust, position bell bracket (5) on support (4). Form the bell hammer stop (5A) to change the tone of the bell.



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The tab set and tab clear mechanisms operate in a similar manner. Both the set and the clear will operate arm (12) and stop setter (10). The set key will pull stop setter (10) down (setting a tab stop blade), and the clear key will push stop setter (10) up (clearing a tab stop blade). Therefore, these two may be adjusted as one.

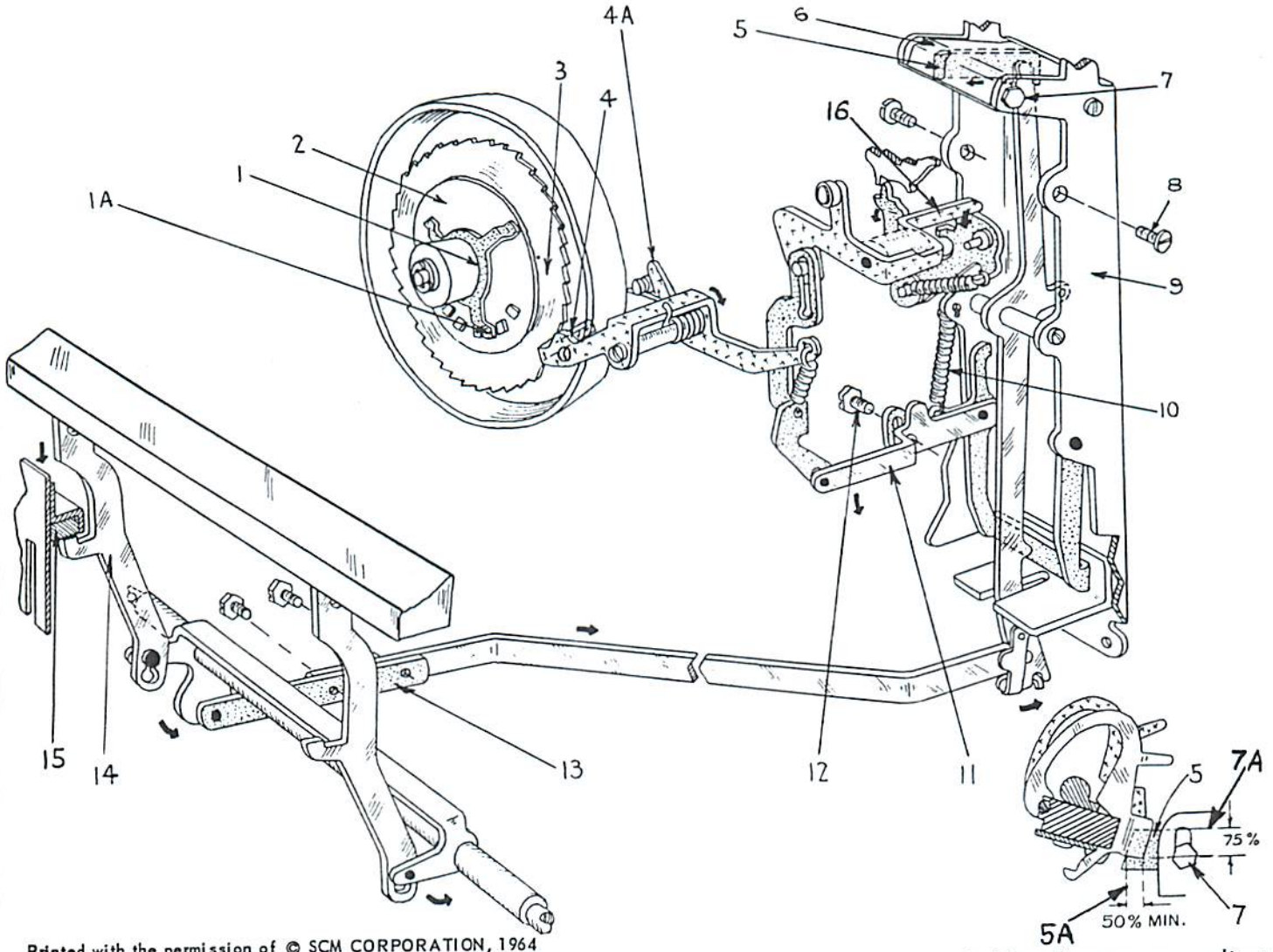
Step 1 – The stop setter (10) should align perfectly with a tab stop blade. To adjust, loosen screw (11) and move arm (10) as needed. Tighten screw (11).

Step 2 – In a rest position, stop setter (10) should rest equidistant between a set and a cleared tab stop. To adjust, loosen screws (7), (19), and (4). Adjust the height of arm (10) by positioning arm (15) with screw (14). Do not tighten screws (7), (19), and (4).

Step 3 – The stud of arm (9) should contact the top of the slot in arm (8), as at (9A). Adjust arm (8) with screw (7). Tighten screw (7).

Step 4 – The tab clear key (2) should be held up against the keylever cushion (1) by spring (6). Adjust arm (5) with screw (4). Tighten screw (4).

Step 5 – The tab set key (18) should be held up against the keylever cushion (1) by spring (16). Adjust arm (17) with screw (19). Tighten screw (19).



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NOTE: All escapement adjustments must be correct before adjusting the tabulator.

Depressing the tab bar (14) will cause the following three things to happen.

1. Blade (5) will come forward to contact the tab set stop.
2. Arm (16) will hold the loose dog out of the path of the starwheel.
3. Arm (4) will engage in gear (3) placing friction on the mainspring drum, thus giving the carriage braking action.

Step 1 – The tab rack should be positioned either to the left or to the right, thus allowing tab blade (5) to enter in between two set tab stops when the tab bar is depressed. To adjust, move the tab rack either left or right as needed.

Step 2 – At the same time that the tab rack is being adjusted left to right, the front to rear distance should be adjusted. This front to rear adjustment is to insure a 50% bite of the tab blade (5) on a set tab stop, as at (5A), when the tab bar is fully depressed.

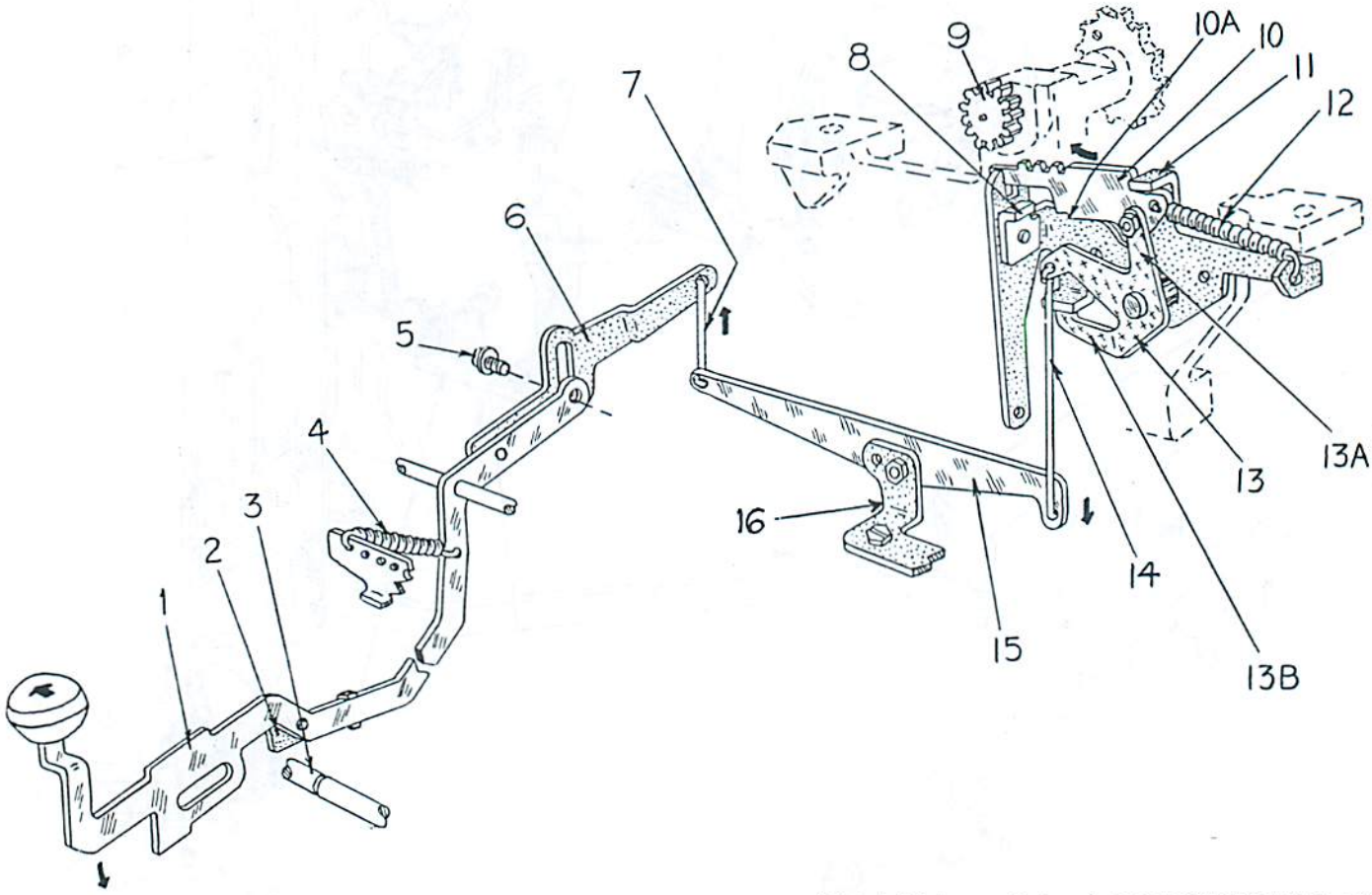
Step 3 – The tab blade (5) should have a 75% bite on a set tab stop at (7A). To adjust, loosen screws (7) and adjust guide (6) up or down as needed.

Step 4 – Spring (10) should hold tab stem (14) up against cushion (15). To adjust, loosen the screws and adjust the connection at (13).

Step 5 – The loose dog should enter the path of the starwheel tooth before blade (5) is disengaged from the set tab stop. To adjust, loosen screw (12) and adjust arm (11) as needed.

Step 6 – Brake pawl (4) should engage brake gear (3) at the same time the loose dog leaves the starwheel tooth. To adjust, form arm (4A) as needed.

Step 7 – The speed of the carriage during tabulation is controlled by the spring tension of spring (1). To adjust, reposition spring (1) into other detents.



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NOTE: FIRST RECHECK THE ESCAPEMENT ADJUSTMENTS.

All of the back space mechanism must be free of binds. Then adjust the back spacer with the following steps done in sequence.

NOTE: There are two holes in bracket (16). The one on the left is for (5) and (6) pitch machine, and the one on the right is for all other pitches.

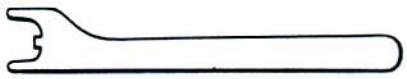
Step 1 – There should be a minimum of up and down movement of back space dog (10) when dog (10A) is held into contact with plate (A). (This is done by raising up link 7). To adjust, turn screw (5) until it is very loose and adjust plate (8) up or down as needed. (Do not tighten screw 5).

Step 2 – The first tooth of dog (10) should enter between two teeth of pinion (9) and should rotate pinion (9) approximately one and one-half spaces. To adjust, form rest stop (11) to the left or to the right.

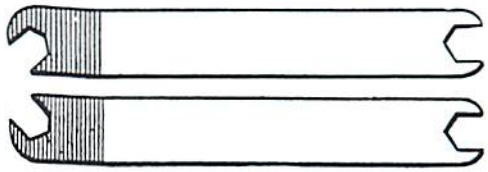
Step 3 – In the rest position, the teeth of dog (10) should clear the pinion by 1/16". To adjust, form arm (13B) up or down. (Do not form link 14 for this adjustment).

Step 4 – Hold back space key (1) up and tighten screw (5).

Step 5 – There should be a slight clearance between plate (2) and shaft (3) when the back space key is fully depressed. To adjust, move plate (2) as needed.

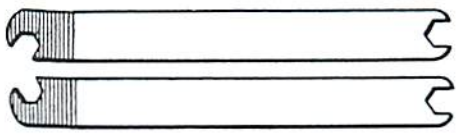


NO. AL-12-C SPANNER WRENCH



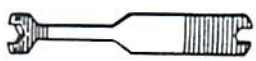
NO. 20 MOTION WRENCHES

NO. AL-12-AC SPANNER WRENCH



NO. 21 MOTION WRENCHES

NO. 4-KM SUBLEVER BENDER AND ALIGNING WRENCH

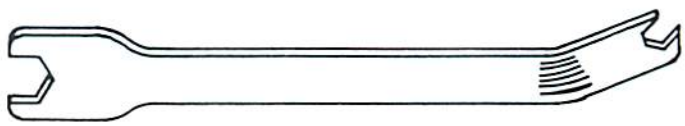


NO. 27 ESCAPEMENT WRENCH

NO. 61-KM WRENCH

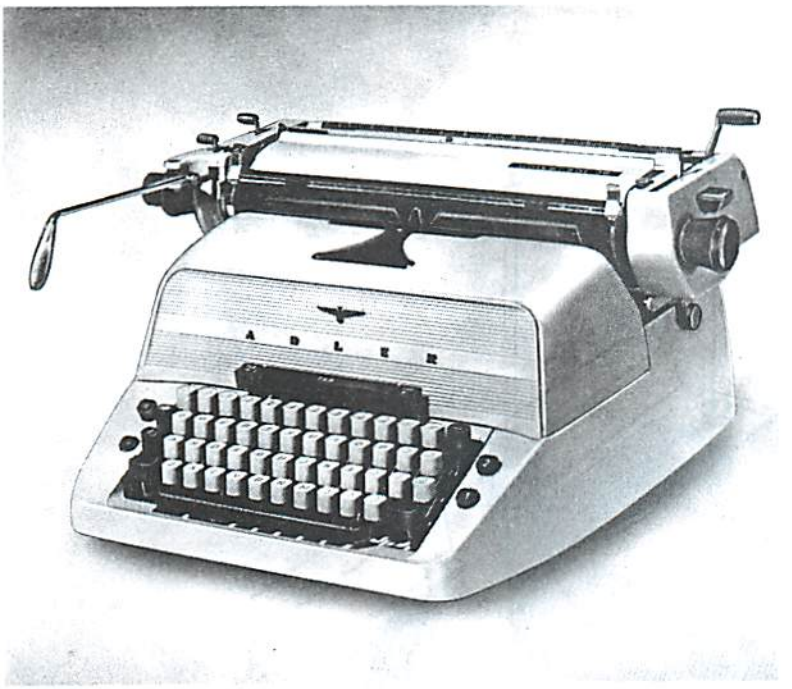
NO. 30-KM SOCKET WRENCH

NO. 62-KM WRENCH



NO. 60-KM WRENCH

NOTES



Illustrations provided through the courtesy of Grundig-Triumph-Adler Sales Corporation.

Technical Material written by the author.

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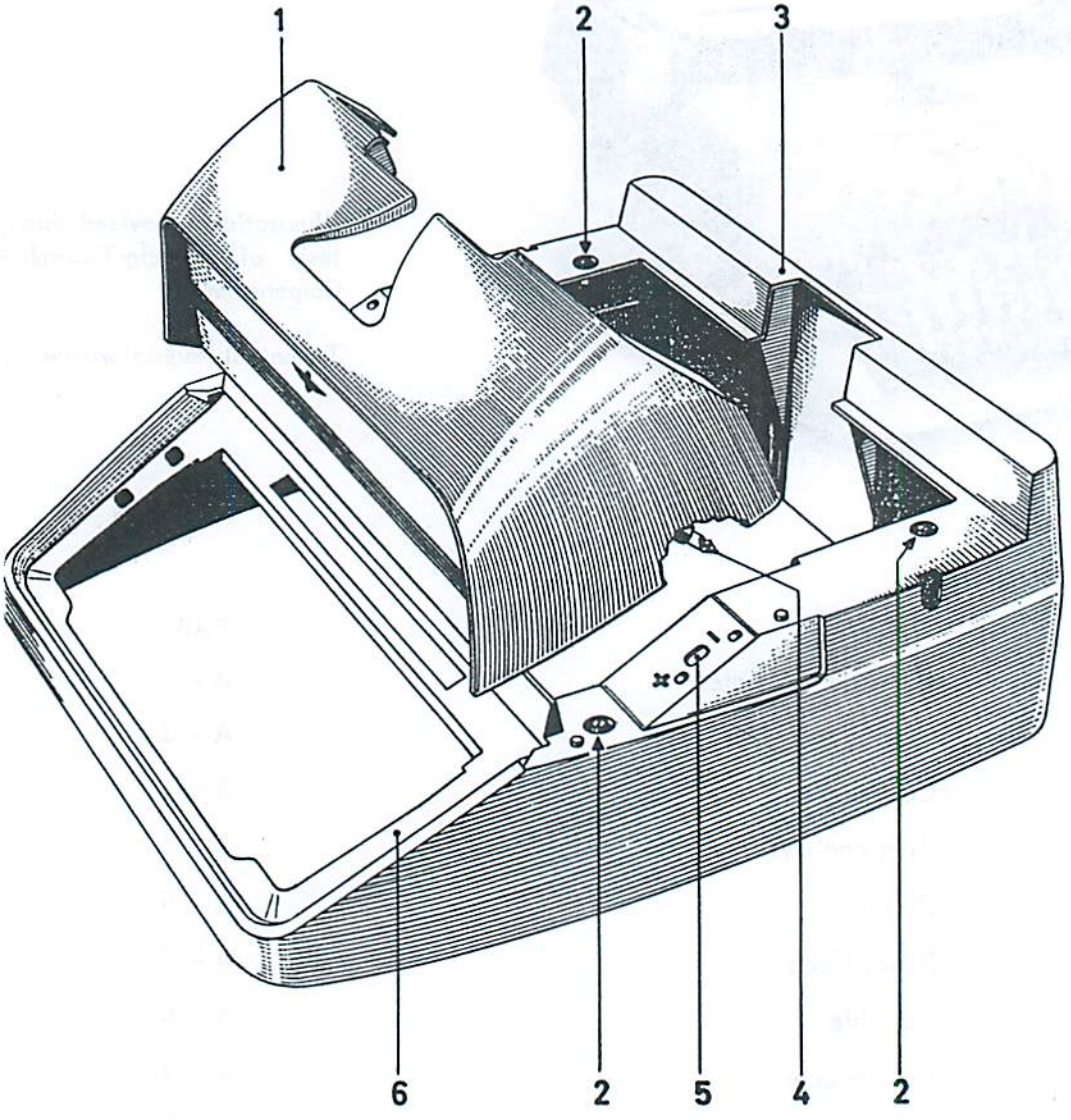
Ribbon Feed	A – 14
Bichrome	A – 15
Tabulator Rack	A – 16
Tabulator	A – 17
Back Spacer	A – 18
Tools	A – 19



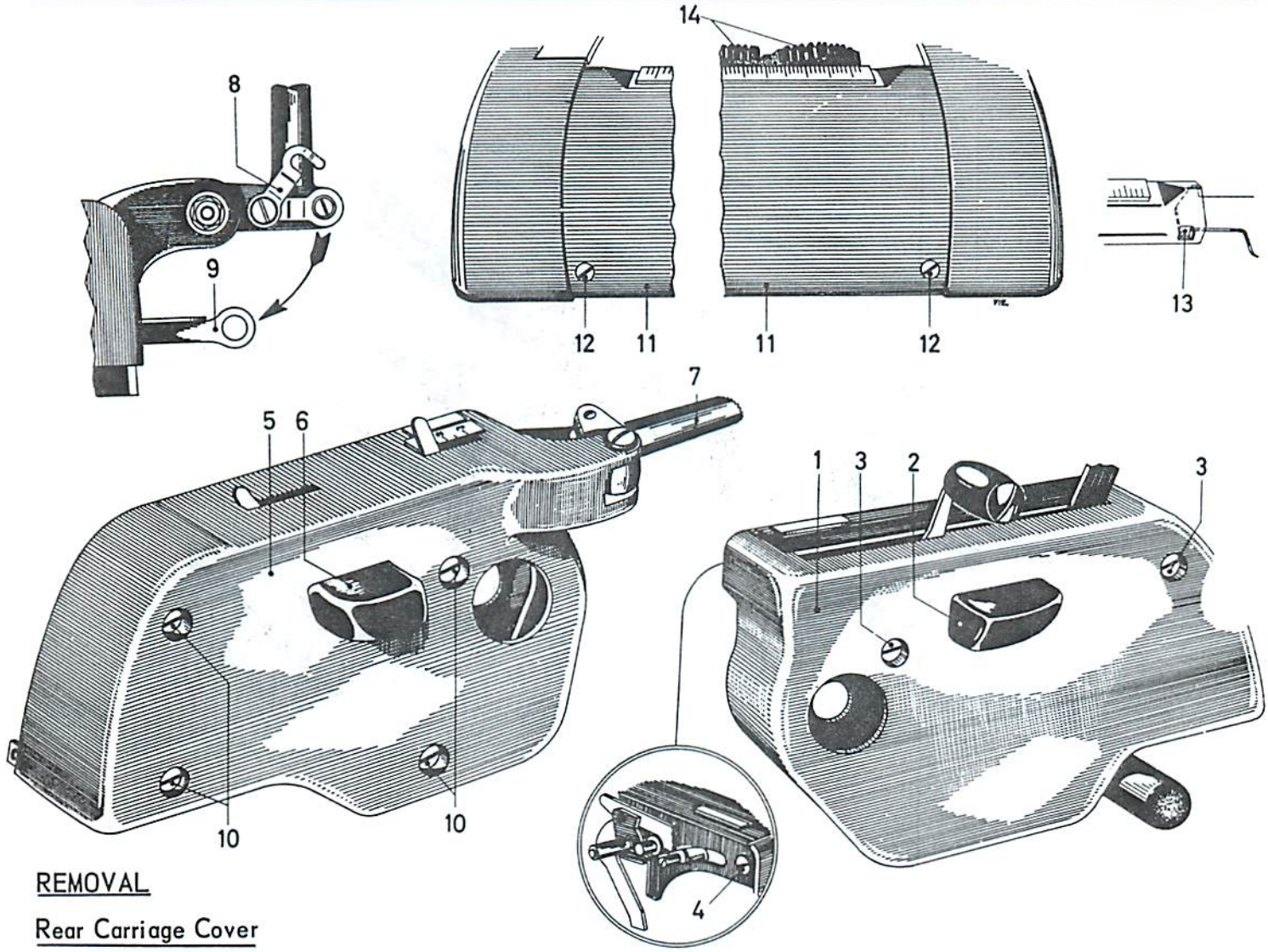
REMOVAL

Remove Carriage. (See Carriage Section)
Lift Cover (1) up.
Loosen Screws (2). (2 back, 2 front)
Remove Cover Plate (3).
Lift Cover Panel (6) off.

REPLACEMENT

Fit Cover Panel (6) into place.
Replace Cover Plate (3) to base of machine.
Install Screws (2) (4).
Fit Cover Plate (1) into openings in casing.

CARRIAGE COVER PLATES



REMOVAL

Rear Carriage Cover

Set both Margin Stops to extreme L or R.
Remove screws (12).
Remove Rear Carriage Cover (11).

Right Carriage Cover

Remove Right Platen Knob.
Remove Set Screw under Carriage Release Lever (2). Remove Lever (2).
Remove Screws (4) and (3).
Remove carriage Cover (1).

Left Carriage Cover

Remove Left Platen Knob.
Remove Set Screw under Carriage Release Lever (6).
Remove Lever (6).
Turn Lock (8) to the left.
Unhook Bar (9).
Remove Screws (10) (4).
Remove Cover (5) with Line Spacer (7).

REPLACEMENT

Left Carriage Cover

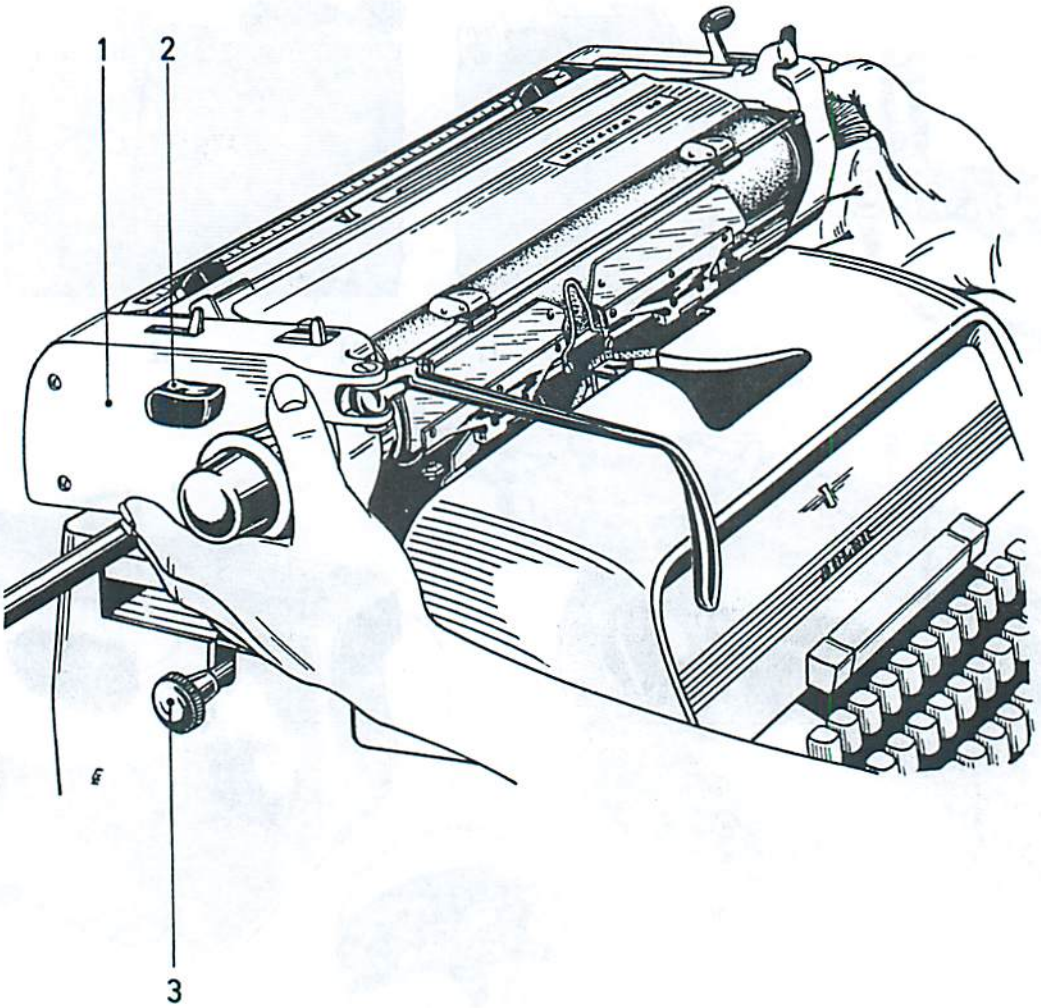
Position Cover (5) with Line Spacer (7).
Replace Screws (10) (4).
Hook Bar (9).
Replace Lever (6).
Replace Platen Knob.

Right Carriage Cover

Replace Cover (1).
Replace Screws (4) and (3).
Replace Lever (2).
Replace Platen Knob.

Rear Carriage Cover

When replacing Rear Cover, check that Support Angles (13) engage in Slots in the Rear Cover.
Replace Rear Cover (11).
Replace Screws (12).



REMOVAL

Loosen Screws (3). (1 left, 1 right).
Lift complete Carriage from base Frame. (See drawing).

REPLACEMENT

Fit carriage into holes in base Frame.
Operate Carriage with Release Lever (2), L to R; check for proper seating.
Tighten Screws (3).

RING AND CYLINDER

The Ring and Cylinder adjustment should be .003 to .006 clearance between the type bar face and the platen. To adjust, loosen the right screw (3) and move the carriage back and forth as needed.

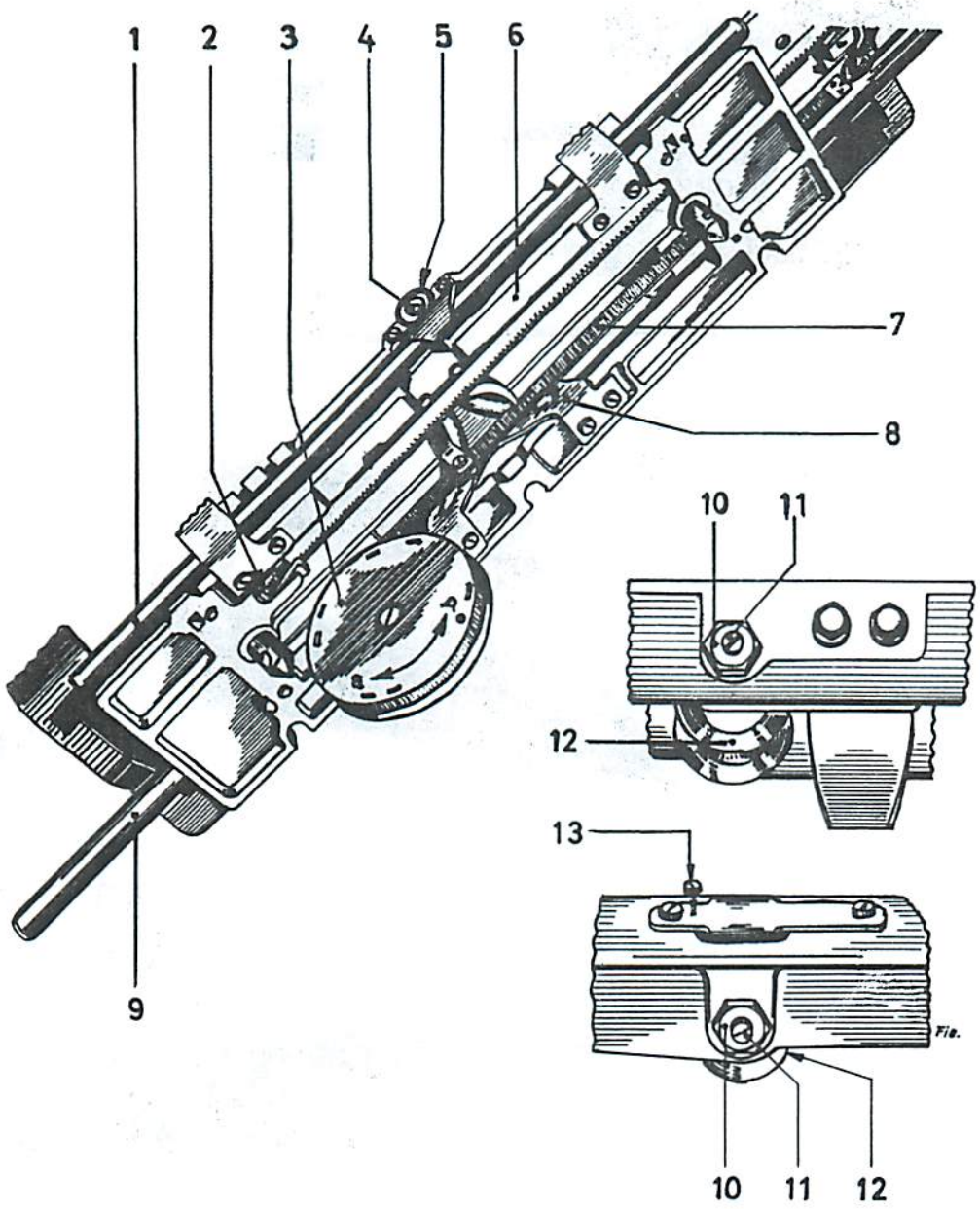
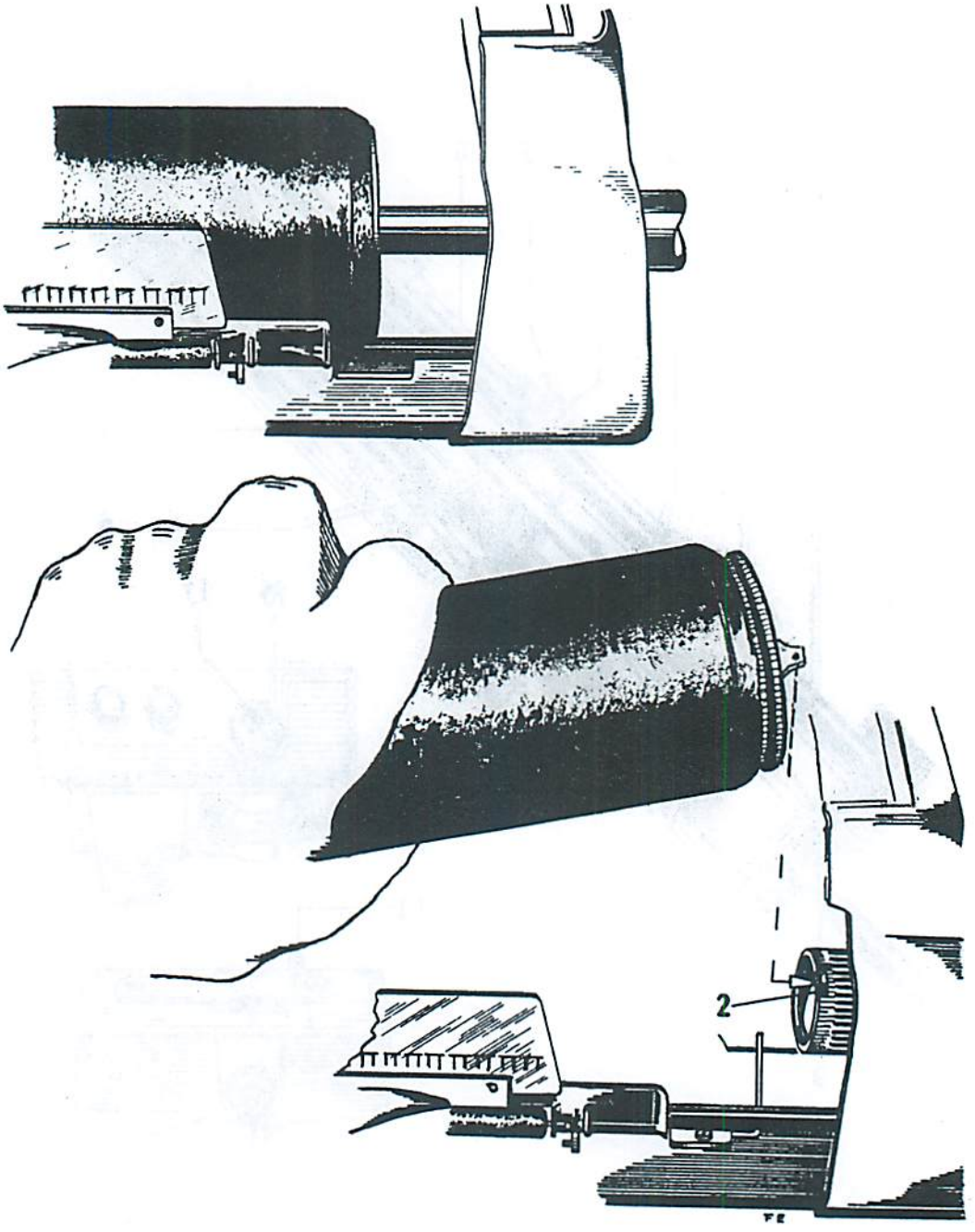


Fig.

To remove the carriage from the carriage frame, disconnect drawband (7). Remove center stop (8). Press locking lever (2), and pull the carriage away from the carriage frame.

To adjust the carriage on the carriage frame for proper fit, adjust the rear rolls (12) by loosening lock nuts (10) and turning screw (11) as needed. The right rear roll is adjustable by set screw (13).

To adjust the mainspring tension, remove the drawband and wind mainspring drum (3) in the direction of "A" about 6 to 7 turns.

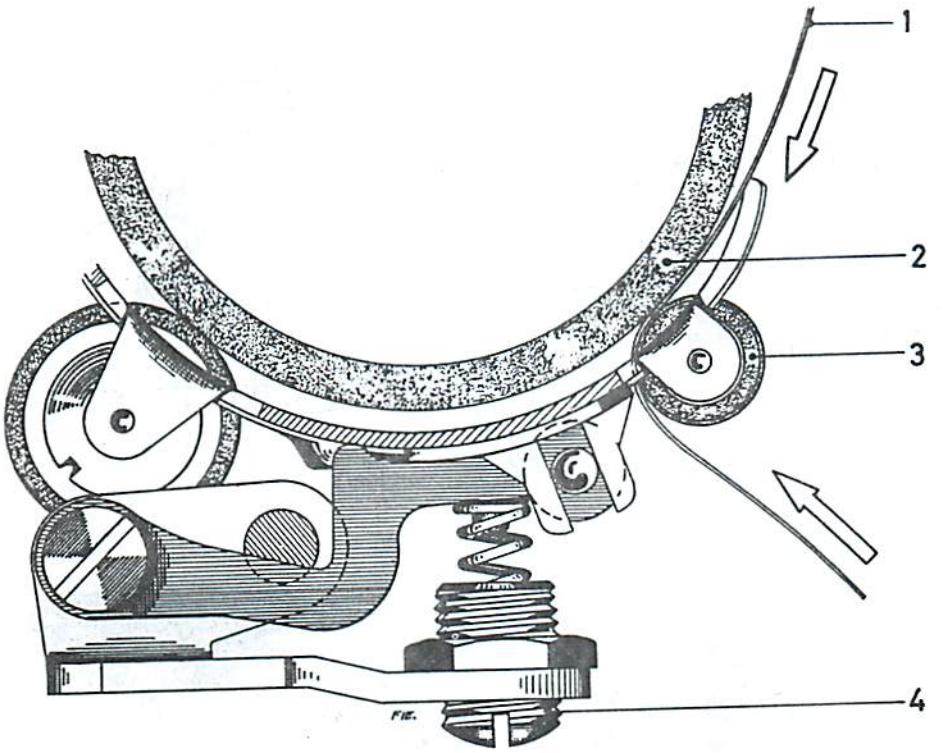


REPLACEMENT

Engage Nose (1) to Recess (2).
Check for Bind Freedom.
Check that end Shafts are straight – not bent.

REMOVAL

Lift Erasing Table and pull forward.
Remove L and R Platen Knobs.
Release Platen Release Levers.
Lift Platen out – right side first.



There should be equal pressure of the feed rolls at both the left and the right sides. Test for paper "drag" by inserting a 1" strip of paper, as at (1).

Adjust the feed roll tension by unlocking the nut on screw (4) and adjusting screw (4) in or out as needed.

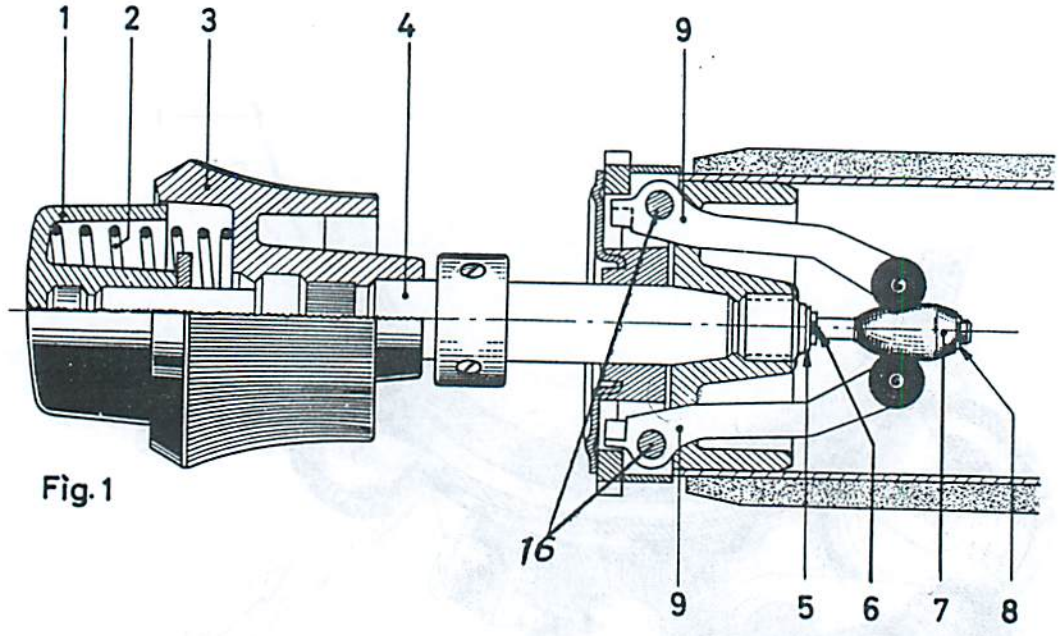


Fig. 1

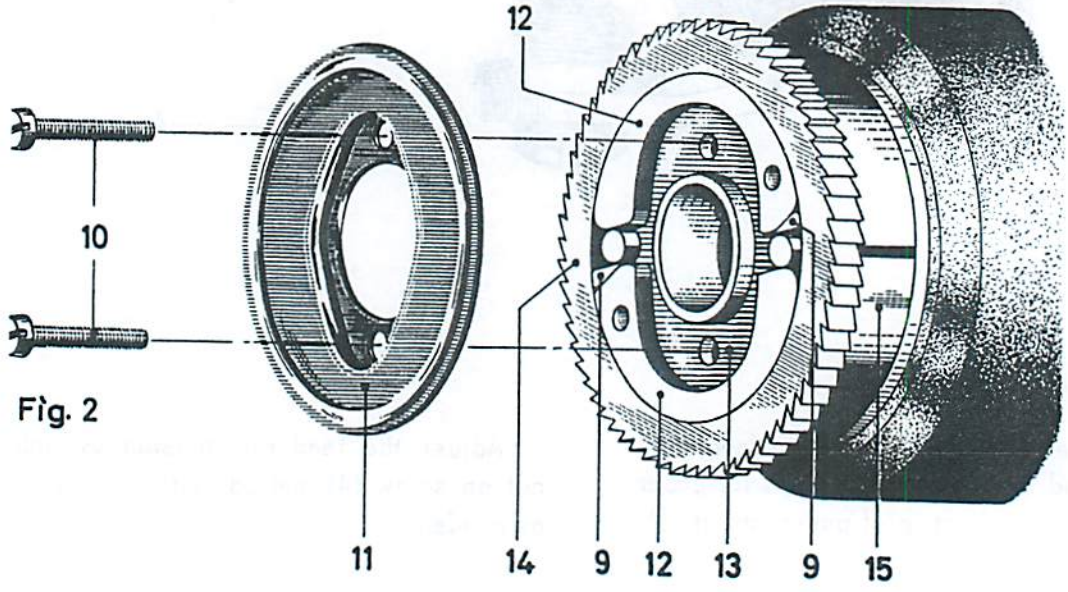
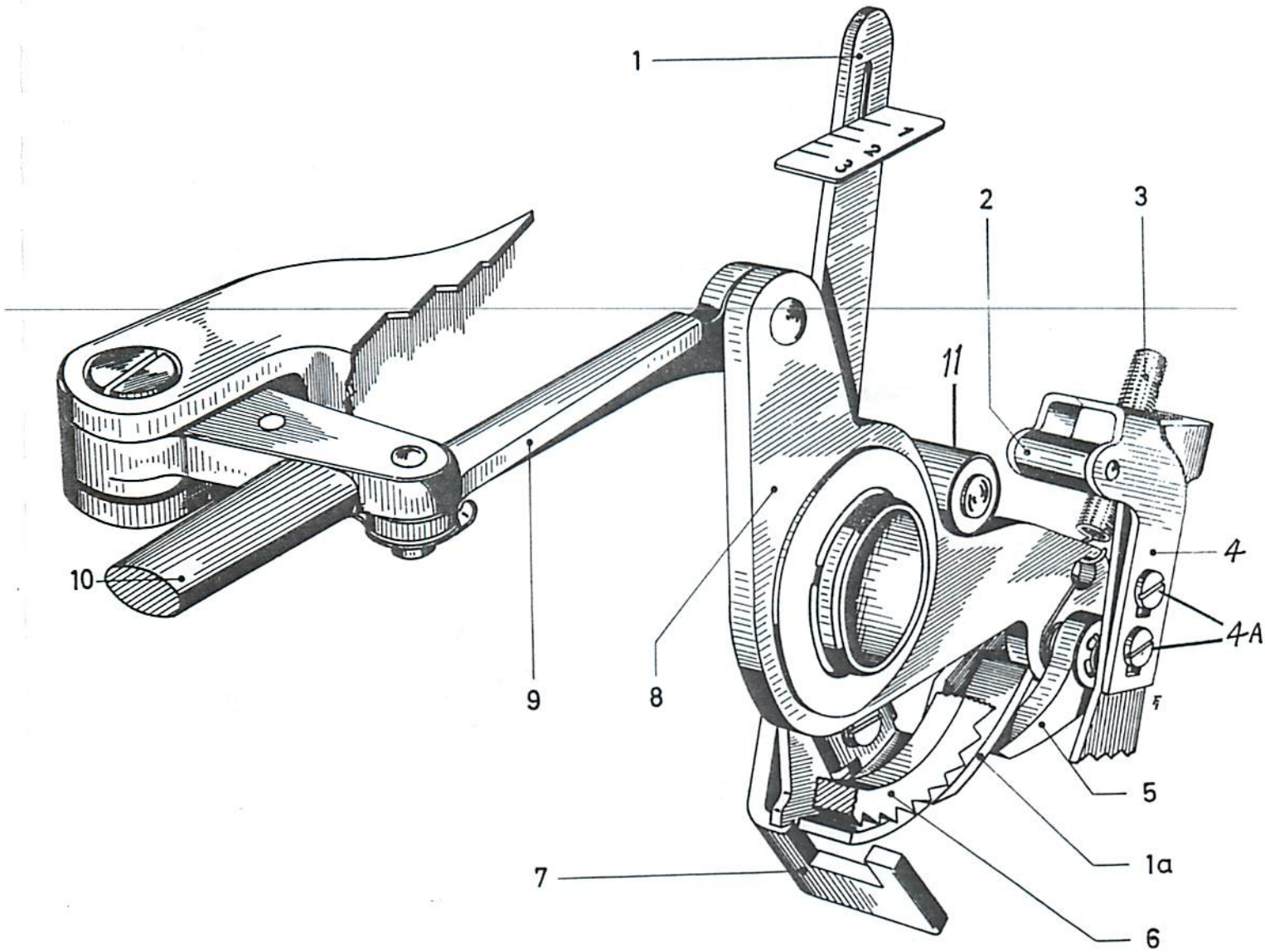


Fig. 2

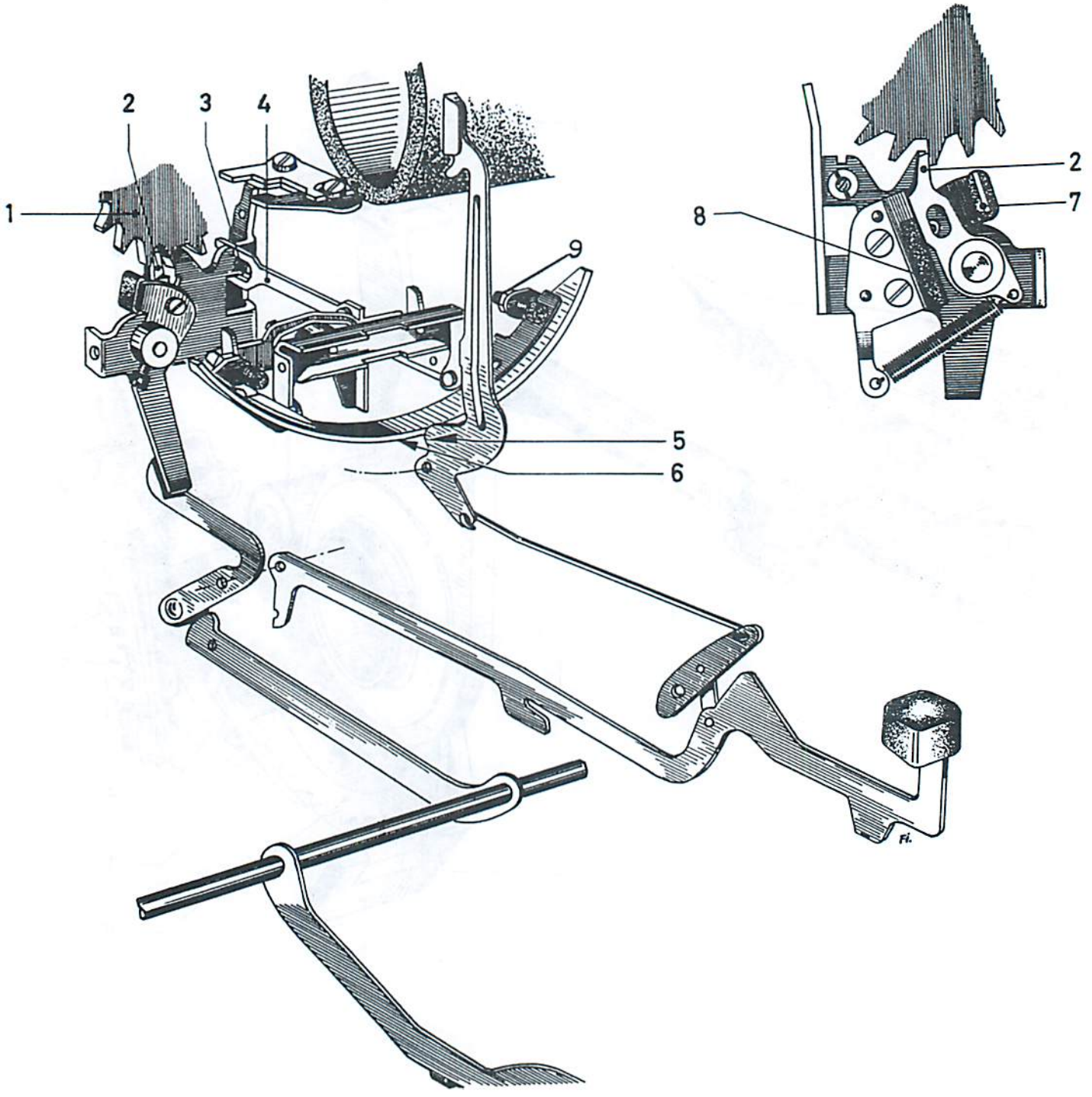
The Variable shoes (12) and the ratchet (14) should be free of oil and dirt. The tension between these two should be sufficient to hold the ratchet and the platen together snugly. To adjust, remove the left platen knob (3) and the ratchet (14). Loosen the lock nut on eccentric screws (16) and adjust screws (16) up or down as needed. Adjust both upper and lower screws (16) until both shoes (12) contact the inner edge of ratchet (14) completely. Tighten nuts on screws (16).



Line space lever (10) should be free of binds. Line space pawl carrier (8) should rest against roll (11) when in a neutral position.

To adjust for proper spacing, loosen screws (4A) and move the ratchet detent plate (4) up or down until pawl (5) spaces one and only one space at a time.

UNIVERSAL BAR AND TRIP ADLER



The type bar should contact the front edge of the universal bar (6) when the type head is 1¾" from the platen. To adjust, turn buffer screws (9) in or out as needed. Check that the contact is even on both sides.

The trip of an Adler typewriter should occur when the type head is 1/64" to 1/32" from the platen. To adjust, turn set screw (3) in or out as needed.

Fig. 1

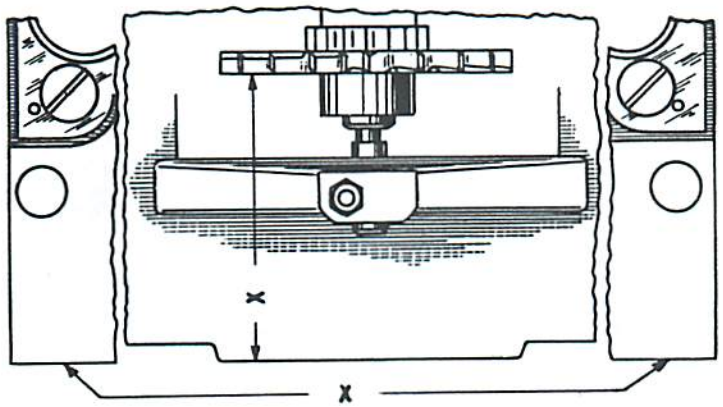


Fig. 2

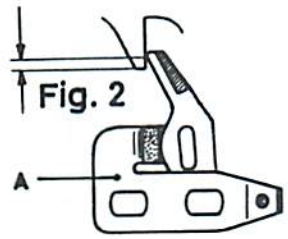


Fig. 6

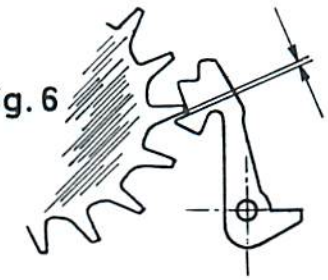


Fig. 3

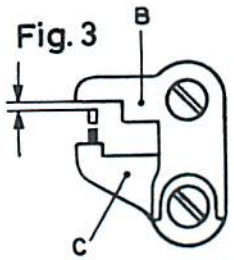


Fig. 4

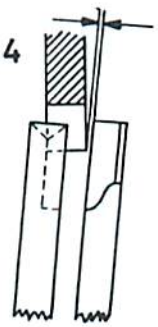


Fig. 5

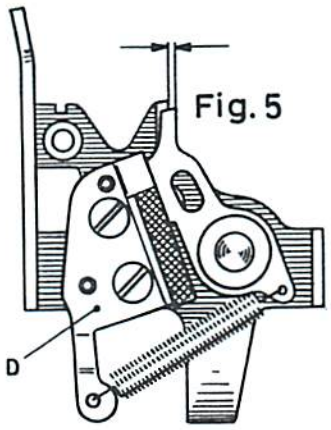


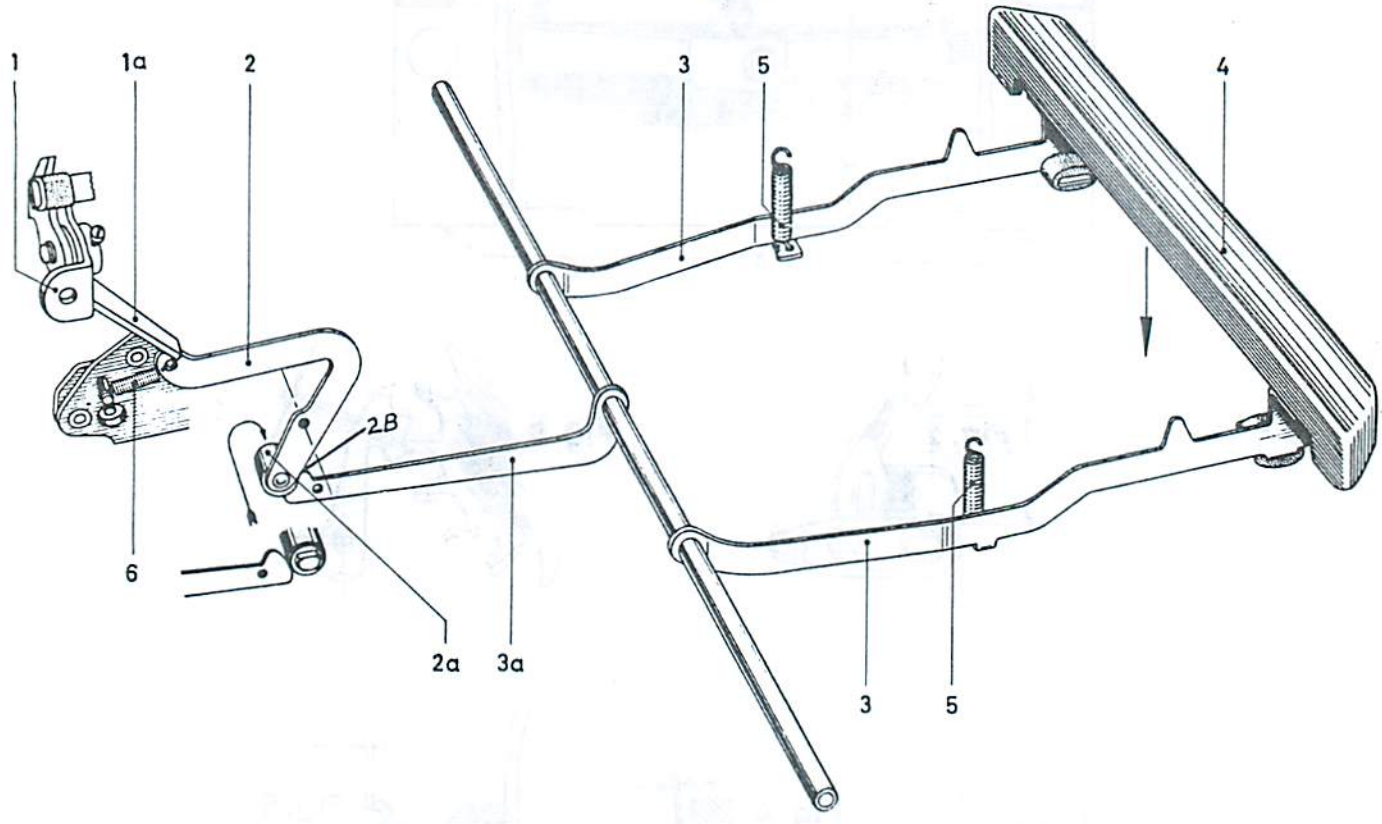
Figure 2 – The loose dog should engage a tooth of the starwheel by .003 to .004 when set to double space. To adjust, set stop "A".

Figure 3 – There should be .003 clearance between the back limit plate "B" and the rocker when a type bar is held to the platen. Adjust stop "B".

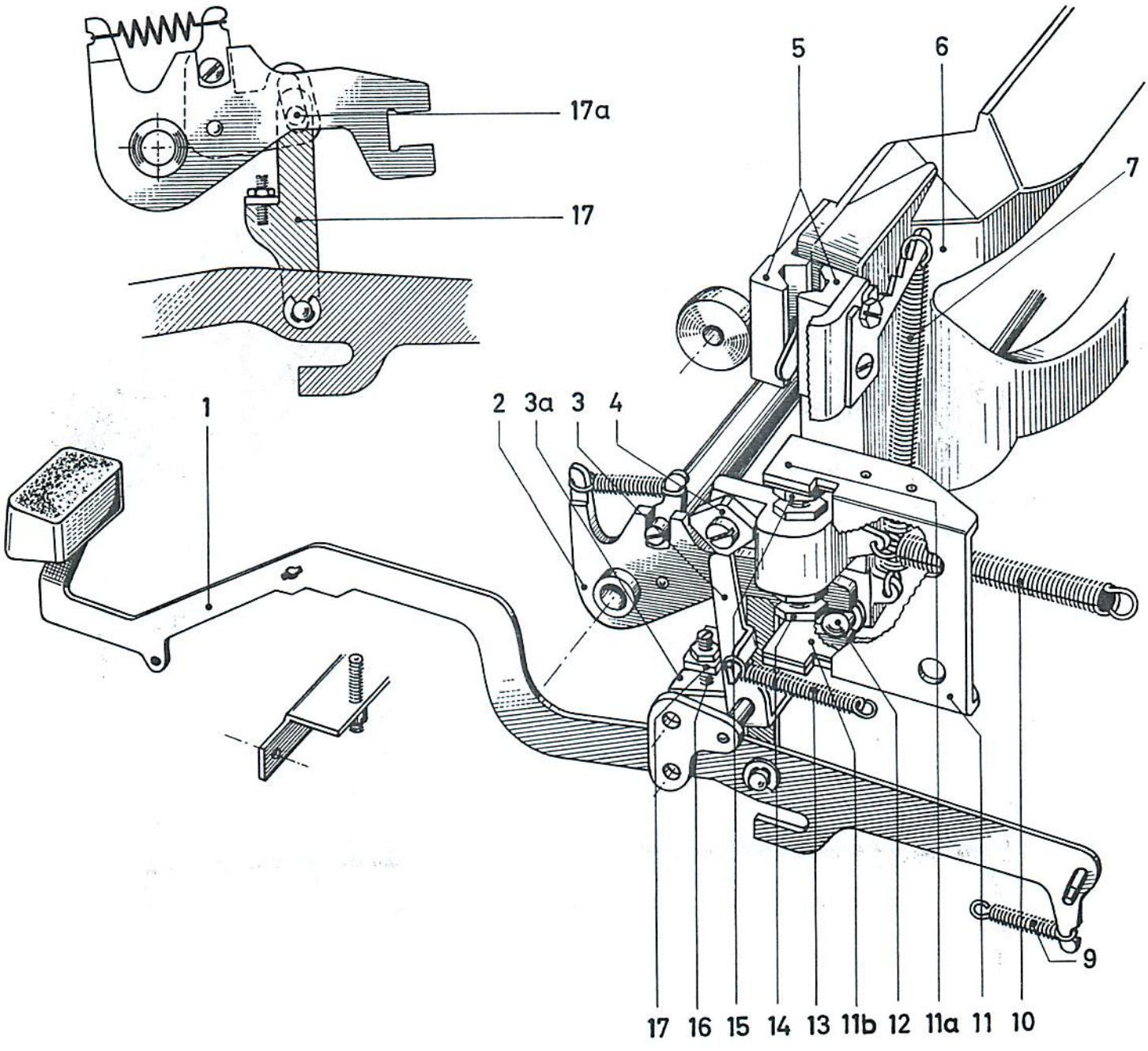
Figure 4 – In a normal position, there should be .010 to .012 clearance between front limit "C" and the front of the rocker. Adjust limit "C".

Figure 5 – The left to right distance between the loose dog and the rigid dog should be .016. To adjust, adjust stop "D".

Figure 6 – The locking pawl should have a clearance of .002 between the locking pawl and the starwheel tooth.



In a normal position, there should be .010 clearance, as at (2B), between the space bar lever (3A) and release lever (2). Adjust with eccentric (2A).

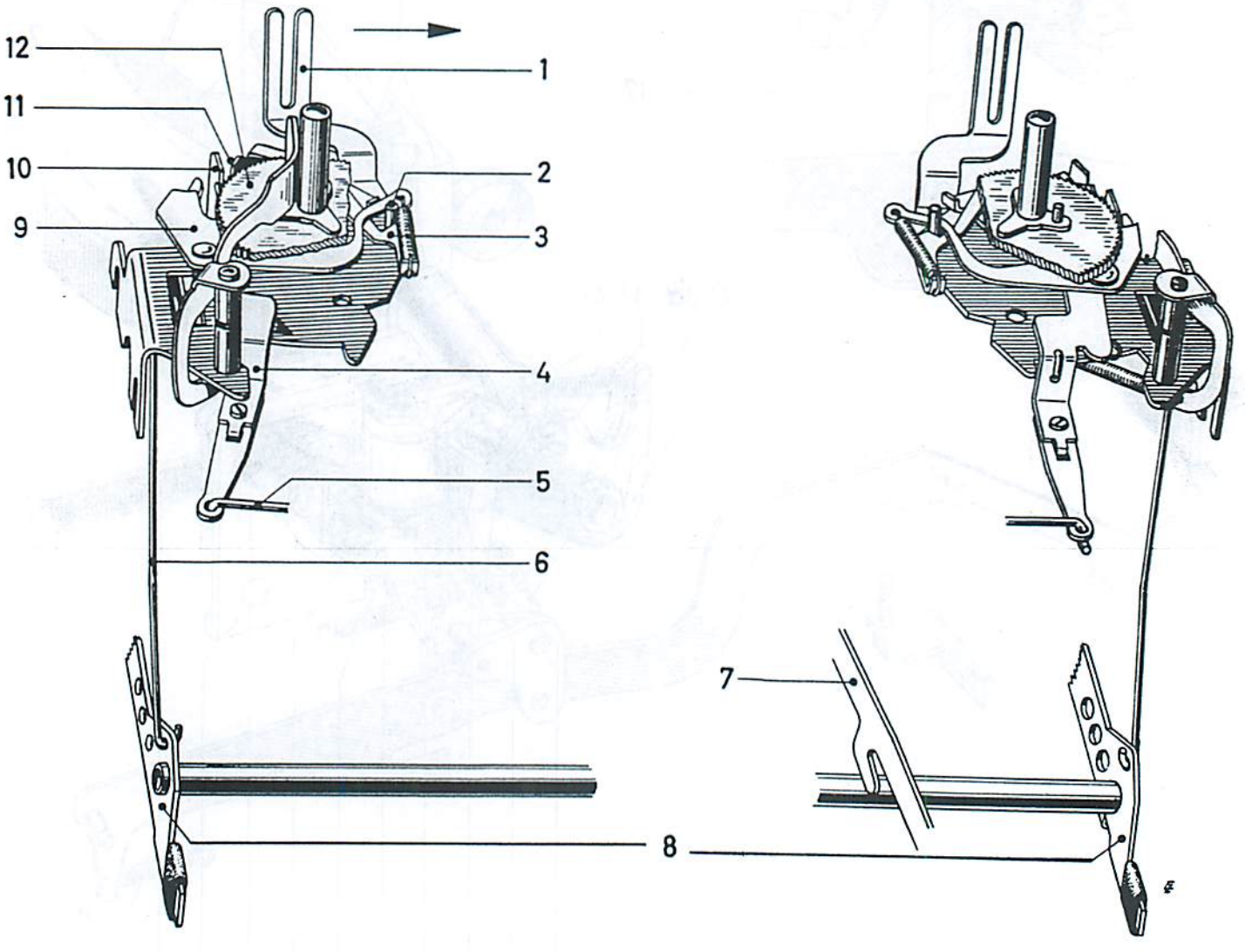


The segment should be free, but snug, in rails (5). Make this check before proceeding with Ring and Cylinder adjustments.

The "on feet" (capital letters) is adjusted with screws (14) left and right.

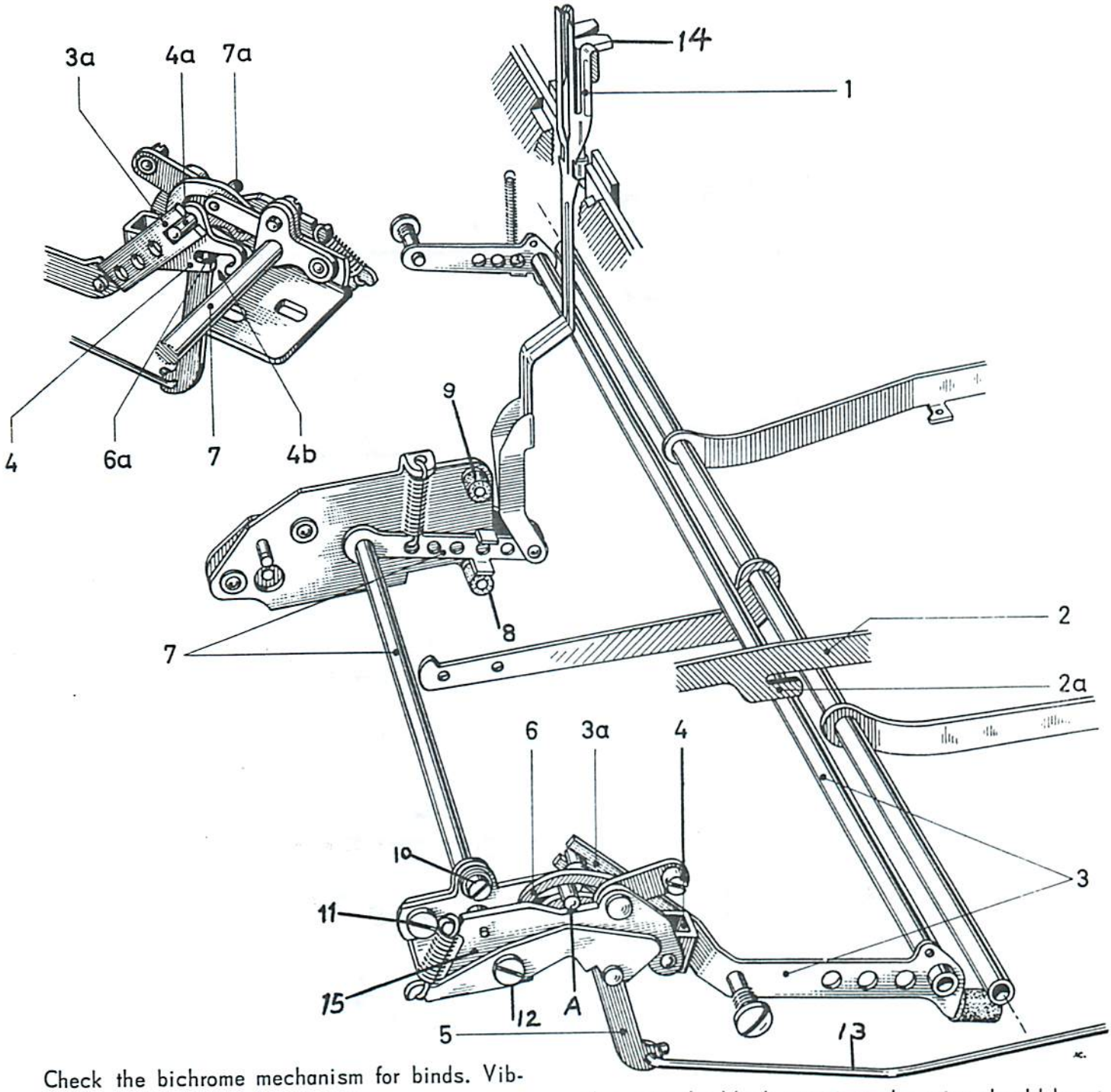
The Motion (small letters) is adjusted with screws (15) left and right.

The segment lock plate (4) should be *contacting* lock arm (3) when the segment is in the up position. To adjust, turn screw (16) up or down as needed.



The ribbon feed is activated by Universal Bar (8). The feeding of spools (12), left and right, should be by at least two teeth at a time. Form links (6) for more or less feed action.

The reverse action occurs when the ribbon spool is empty and the force of the ribbon pulls levers (1) toward the center of the machine. Plate (9) blocks out the feed of that stroke, and arm (4) is pivoted by this action. Check that bracket (1) is completely free of binds, and also check binds in arms (4).



Check the bichrome mechanism for binds. Vibrator (1) must have complete freedom.

There should be about .003 clearance between the stud (7A) and plate (15), as at "A". To adjust, loosen screw (10) and turn eccentric screw (11).

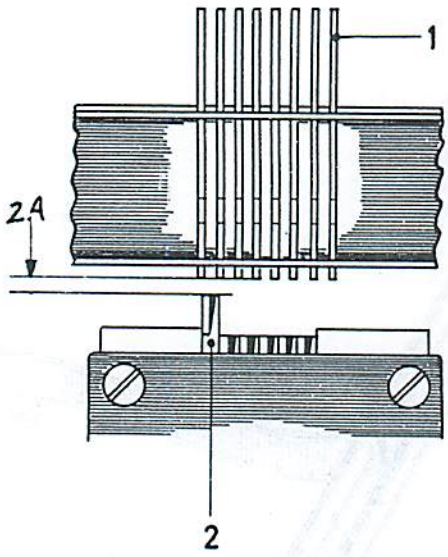
With the bichrome lever in the stencil position, stud (6A) should be positioned in the center of slot (4B). To adjust, form link (13) as needed.

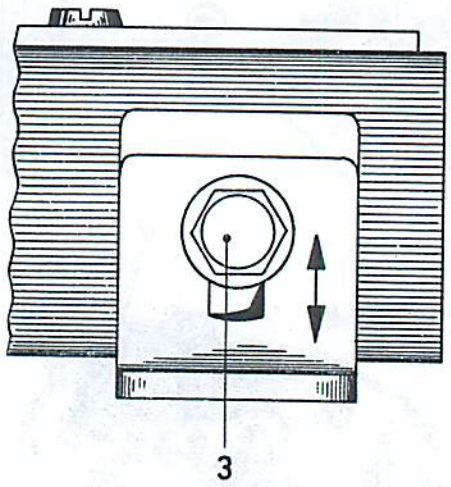
The top of ribbon vibrator (1) should be about 1/8" above the type bar guide (14). To adjust, turn eccentric (8) up or down as needed.

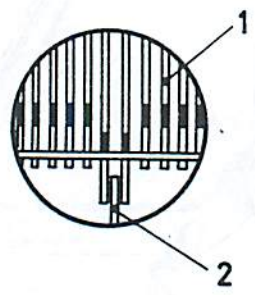
Using the underscore key, and the bichrome lever in the black position, the print should be at the bottom of the black portion of the ribbon. To adjust, turn eccentric screw (12).

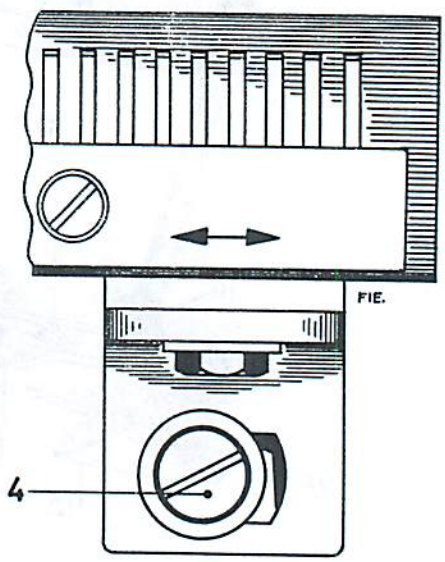
Using the underscore key, bichrome in the red position, the print should be at the bottom of the red portion of the ribbon. To adjust, turn eccentric screw (4).

After adjusting the red throw of the ribbon, adjust stop (9) until the vibrator arm just contacts stop (9) when the ribbon is at full throw in the red position.



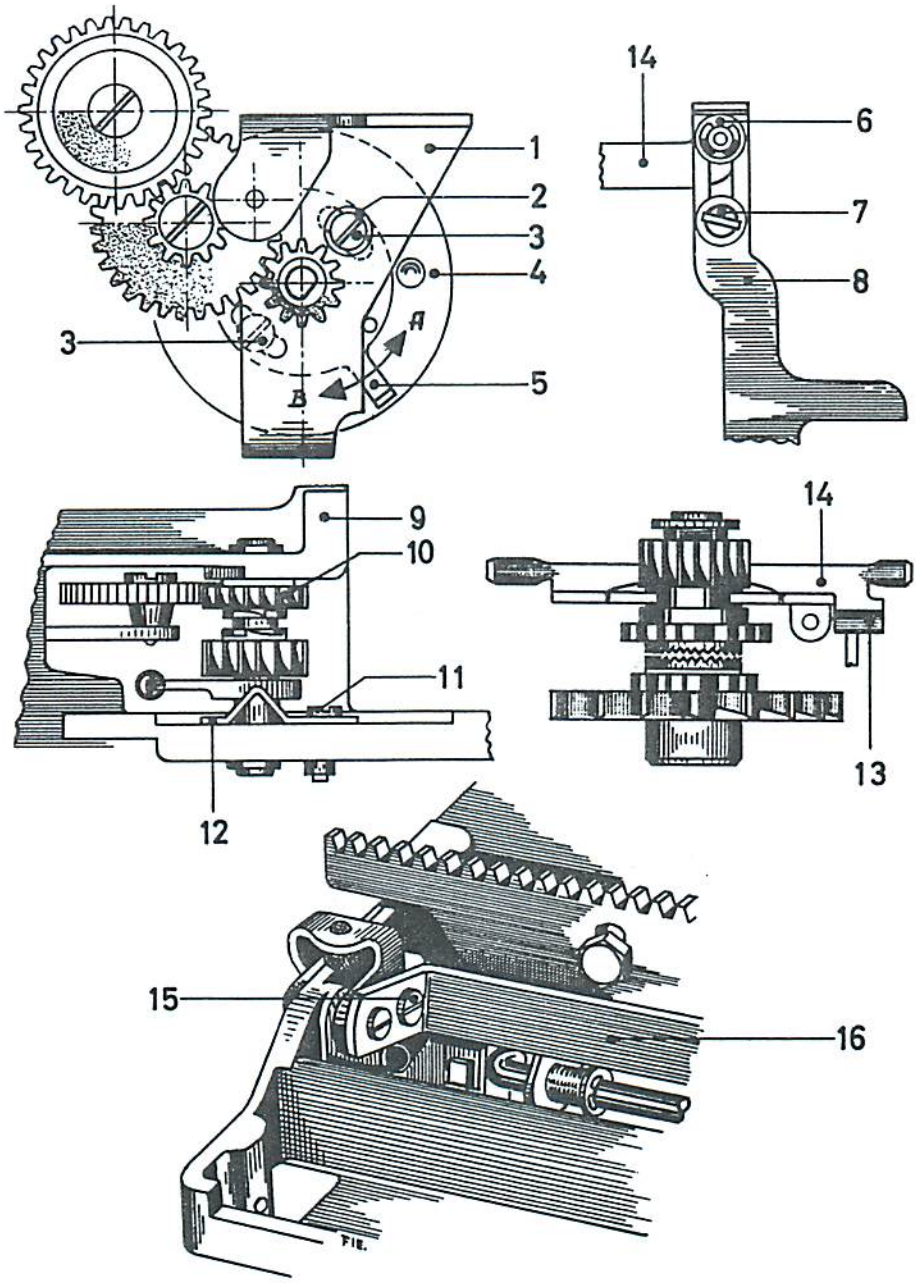






The tab rack should be adjusted both up and down and left and right. There should be a clearance of .020, as at (2A), between the cleared stops (1) and the tab plunger (2) when the tab bar is depressed. To adjust, loosen nuts (3) left and right and move the rack up or down as needed.

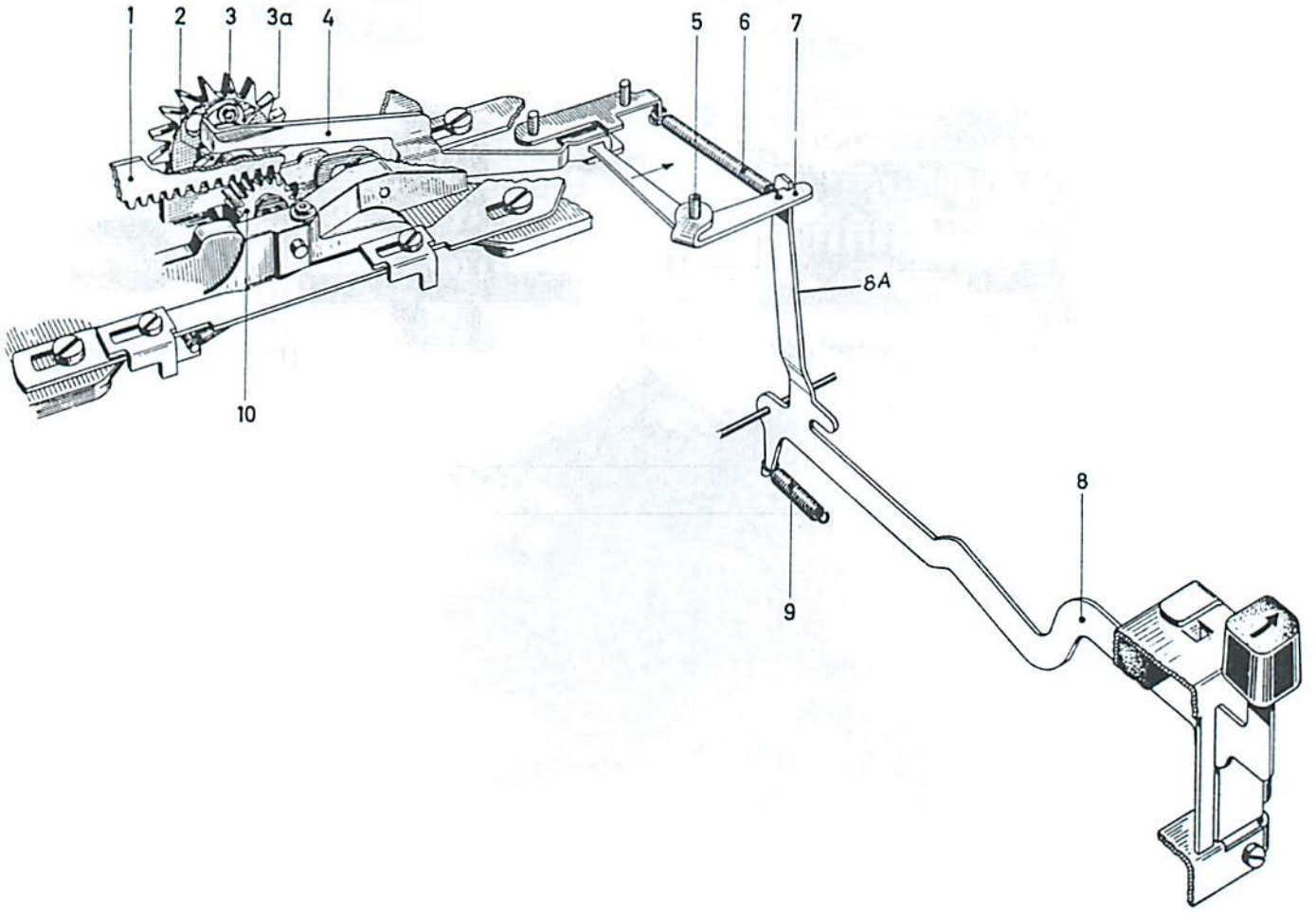
When the tab bar is depressed, the tab plunger (2) should move into the center of the two set stops (1). To adjust, loosen screw (2) and move the rack to the left or right as needed.



To increase the brake action of the tabulator, loosen screws (3) and move lever (5) in the direction of "A". To decrease the brake action, move lever (5) in the direction of "B".

The brake clutch must be in gear before the clutch of the escapement wheel is out of gear. The engagement of the brake clutch is adjusted by loosening screw (11) and turning cam (12).

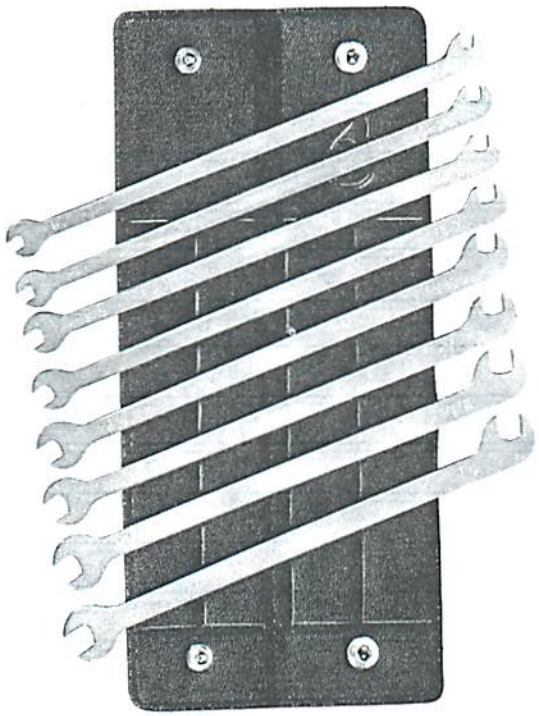
When the carriage is moved through tabulation from left to right, the escapement pinion should be equally disengaged. To adjust, loosen screws (15) and adjust release bar (16).



NOTE: All Escapement adjustments must be correct before the Back Spacer is adjusted.

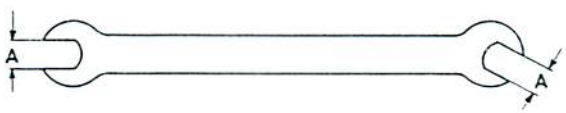
Check that all linkage is free of binds. There should be a slight clearance between arm (8A) and arm (7). To adjust, form arm (8A) forward or rearward as needed.

Check for clearance between pawl (4) and back space pinion (2). Form pawl (4) up or down as needed.



NO. 350-M

In Millimeter Sizes: 3 mm., 3.5 mm., 4 mm., 4.5 mm., 5 mm., 5.5 mm., 6 mm., 6.5 mm., For use on Foreign Machines where Millimeter Sizes are used.



NO. 261 FLAT OPEN END WRENCH

NO. 261 - 4 7 MM.
NO. 261 - 5 9 MM.

NOTES

Illustrations provided through the courtesy of Paillard, Inc.

Technical Material written by the author.

SECTION	PAGE
Cover Plates	H – 2
Carriage Cover Plates	H – 4
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Platen	H – 6
Line Spacer	H – 7
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Mainspring Tension	H – 10
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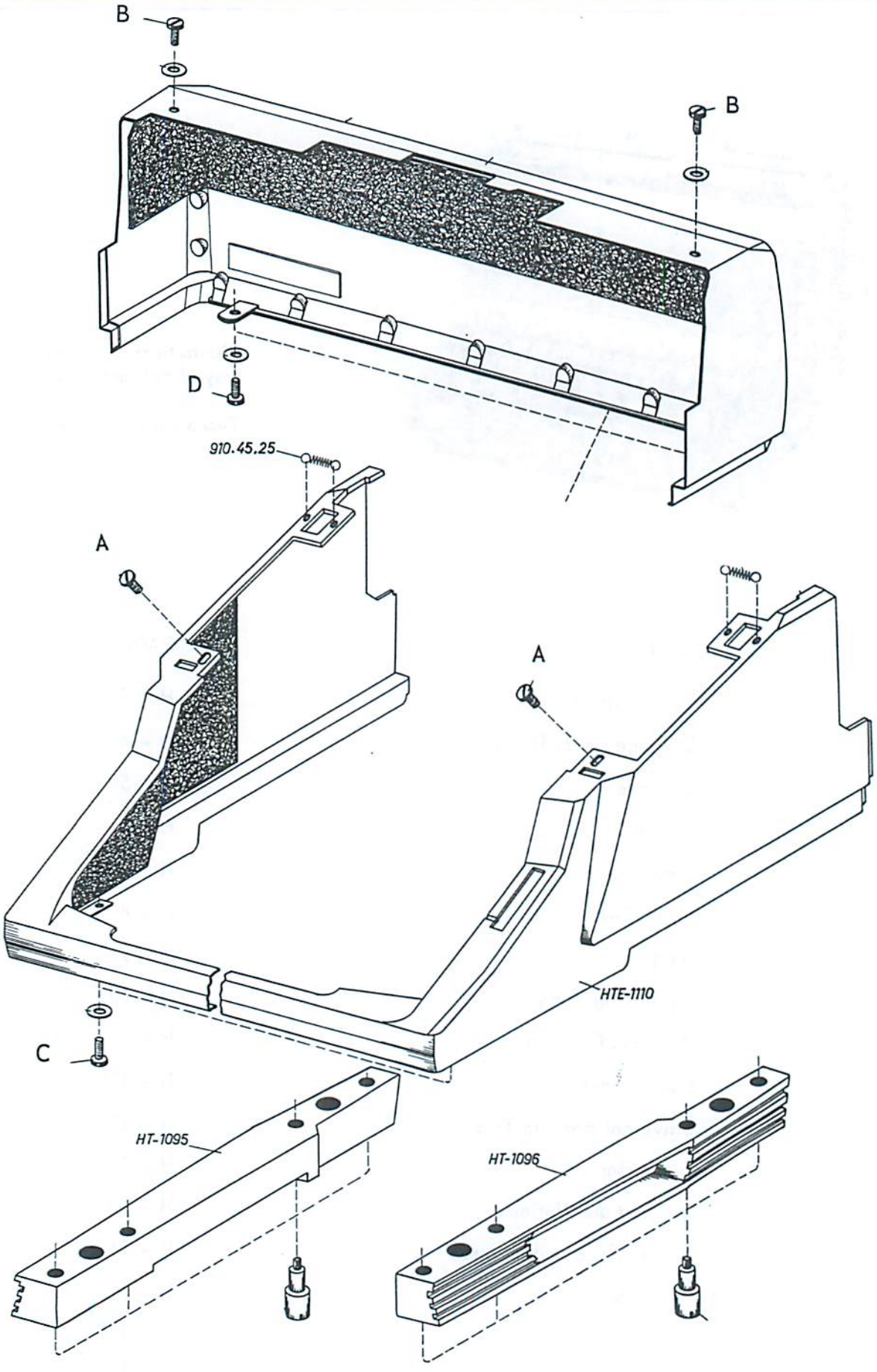
Space Bar	H – 14
On Feet and Motion	H – 15
Ribbon Feed and Reverse	H – 16
Bichrome	H – 17
Tabulator	H – 18
Back Spacer	H – 19


B
B
D
910.45.25
A
A
HTE-1110
C
HT-1095
HT-1096

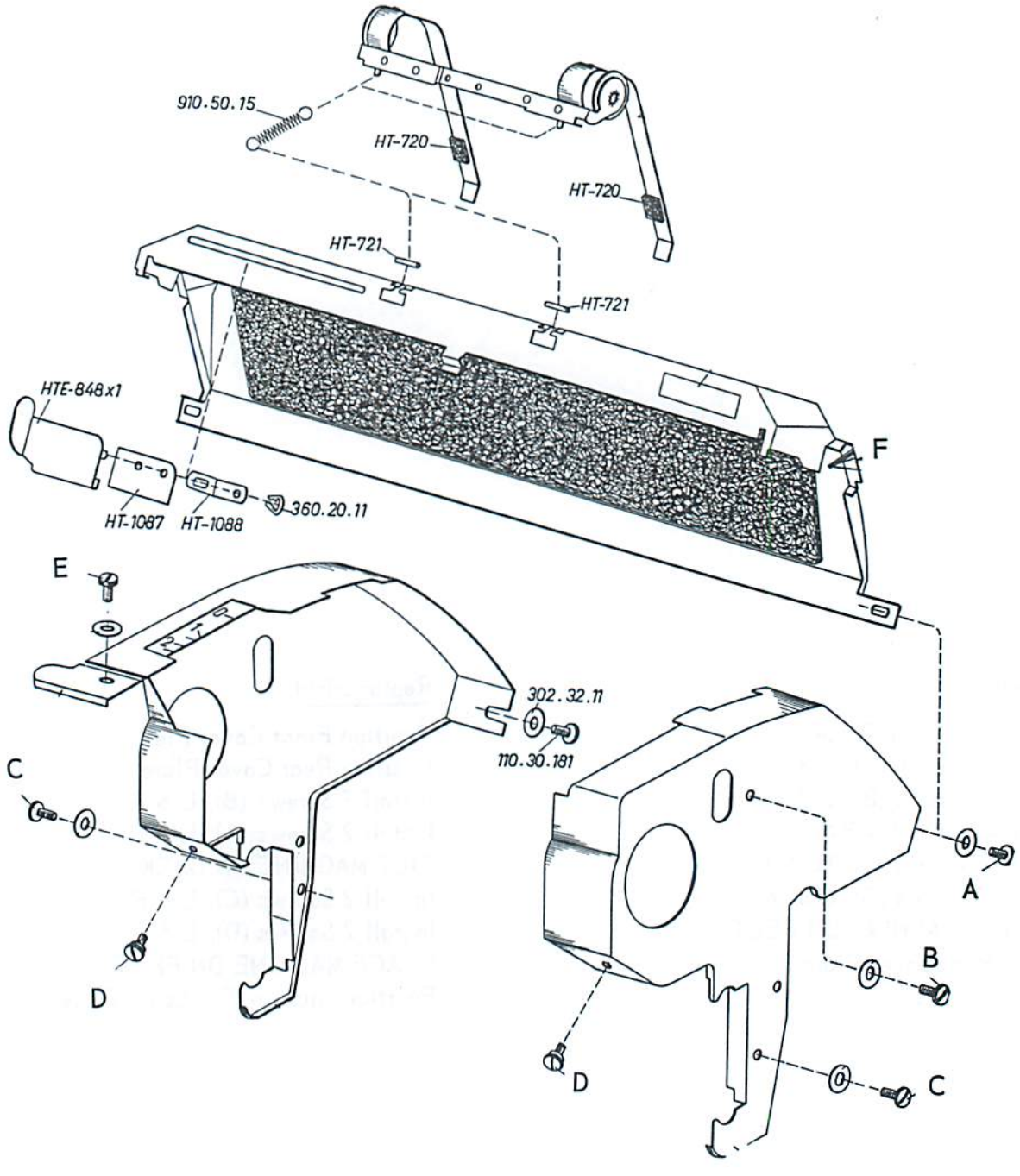
Removal

Lift off Top Cover Plate
Remove 2 Screws (A), L & R
Remove 2 Screws (B), L & R
TILT MACHINE ON BACK
Remove 2 Screws (C),) L & R
Remove 2 Screws (D), L & R
REPLACE MACHINE ON FEET
Remove Rear Cover Plate
Remove Front Cover Plate

Replacement

Position Front Cover Plate
Position Rear Cover Plate
Install 2 Screws (B), L & R
Install 2 Screws (A), L & R
TILT MACHINE ON BACK
Install 2 Screws (C), L & R
Install 2 Screws (D), L & R
PLACE MACHINE ON FEET
Position snap-on Top Cover Plate

CARRIAGE COVER PLATES HERMES

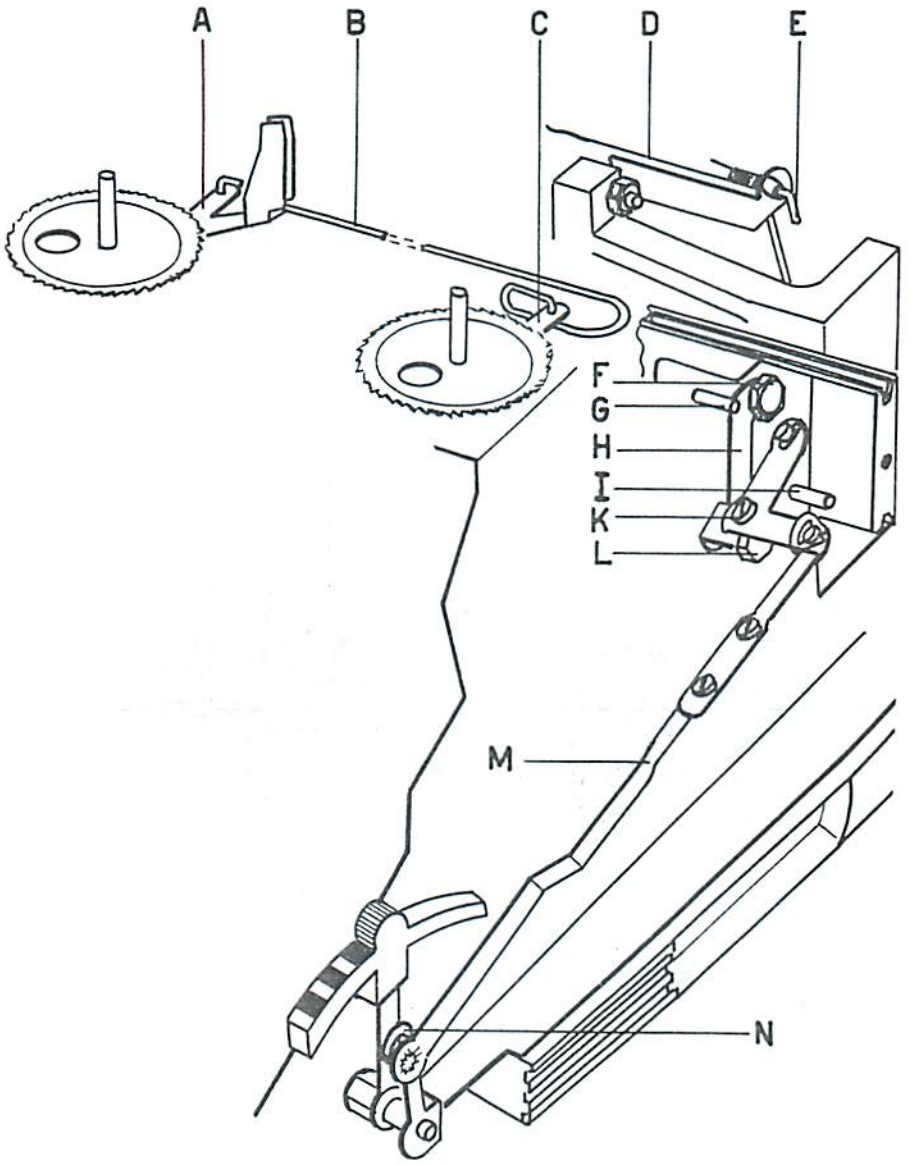


Removal

Remove Screws (A), L & R
Remove Cover Plate F
Remove Screws (B), L & R
Remove Screws (C), L & R
Remove Screws (D), L & R
Remove Screws (E), Left
Remove Left Cover Plate
Remove Right Cover Plate

Replacement

Position Right Cover Plate
Position Left Cover Plate
Replace Screws (E), Left.
Replace Screws (D), L & R
Replace Screws (C), L & R
Replace Screws (B), L & R
Position Cover Plate F
Replace Screws (A), L & R

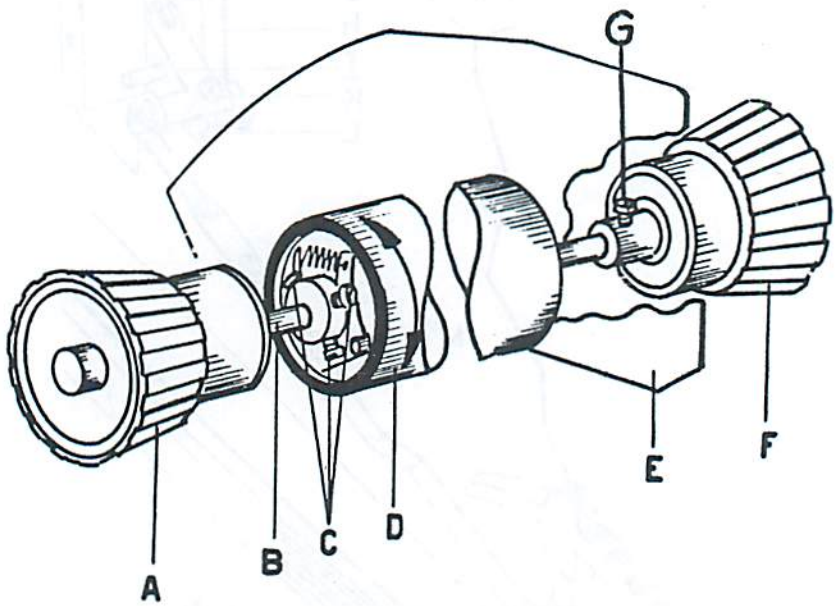


Removal

Remove Cover Plates
Unhook Link (B) from Arm (C)
Remove Link (B) from Arm (A)
Disconnect Drawband (D) from Carriage
Connect Drawband (D) to Link (E)
Remove Screw (K)
Remove Clip (N)
Remove Arm (M)
Remove 2 Pins (G) and (I) on both left and right sides of machine
Move Carriage to the right
Remove Screws (F) and (L) on both left and right sides of machine
Remove Support (H)
Lift Carriage up and off

Replacement

Position Carriage on frame
Replace Support (H)
Replace Screws (F) and (L)
Replace Pins (G) and (I)
Replace Arm (M)
Replace Clip (N)
Replace Screw (K)
Connect Drawband
Replace Link (B) to arms (A) and (C)
Replace Cover Plates

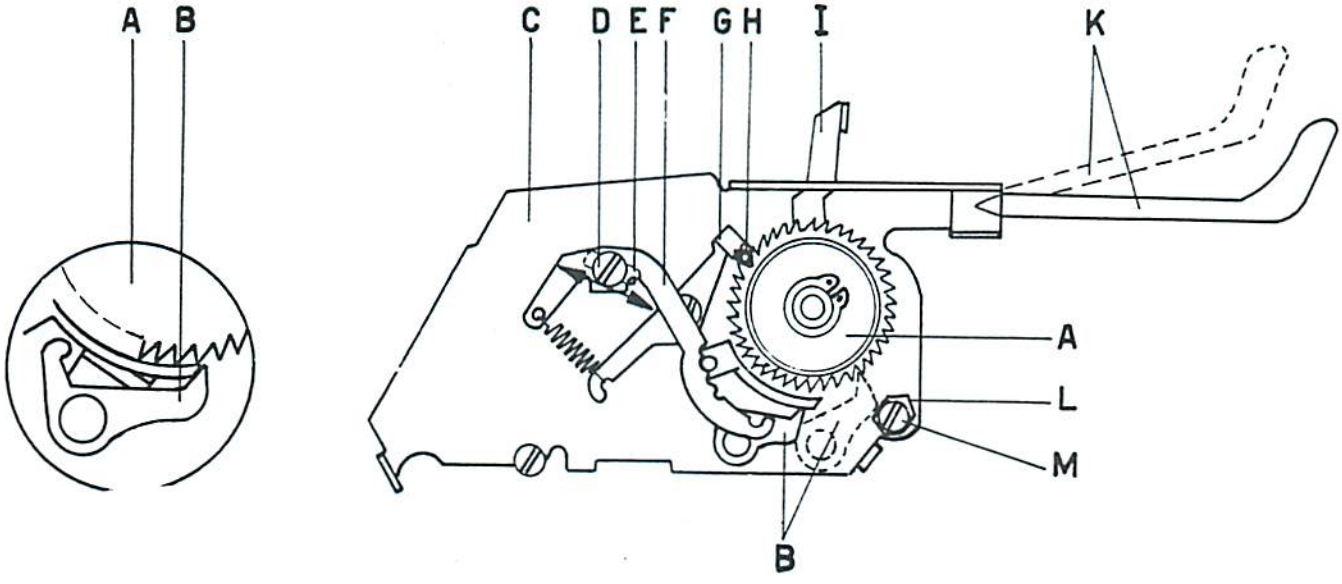


The platen should be free to rotate without binding, with the least possible end play.

To remove the platen:

Loosen screw "G".
Remove right platen knob "F".
Loosen 3 screws "C".
Remove left platen knob and shaft.
Remove platen.

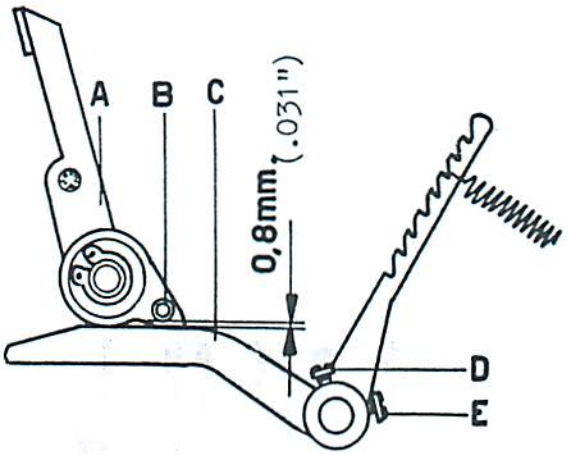
To replace the platen, reverse the procedure.

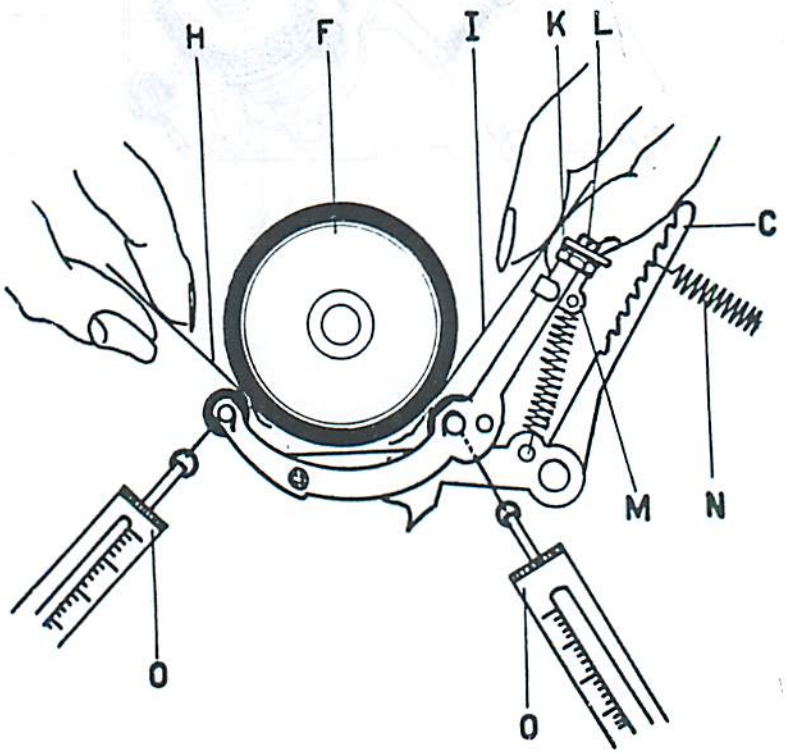


Pawl "B" must enter as at "N". It should enter between the teeth. To adjust, loosen screw (D) and move arm (F) left or right as needed.

Place indicator (I) in position 1. Hold the line space engaged. Pawl (B) should just contact eccentric (M), and detent roll (H) should be exactly between two teeth of ratchet (A). Adjust eccentric (M).

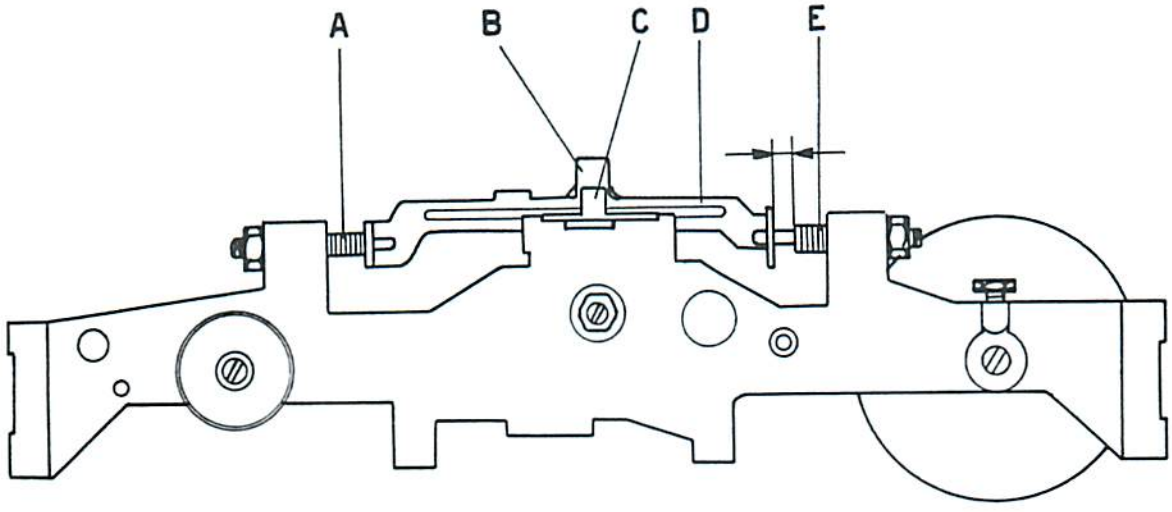
To check this, release the lever very slowly and observe that the ratchet does not creep either frontward or backward.





There should be a clearance of .031 between roll (B) and arm (C). To adjust, loosen screws (D) and (E) and turn lever (C) as needed.

To increase the paper feed tension, move spring (N) higher on arm (G). To decrease the tension, move spring (N) lower on arm (G).



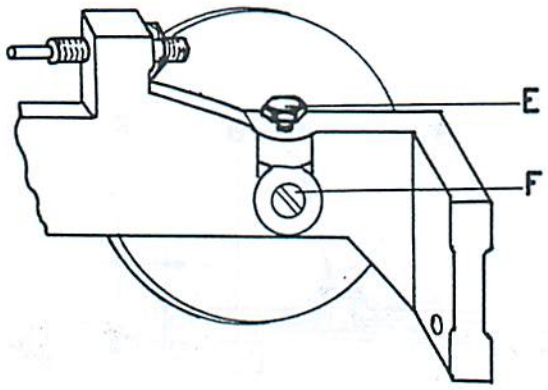
LEFT MARGIN Line stop (C) should line up with lug (B). Adjust screw (A) in or out as needed.

Return the carriage a few times and check for over and under banking. For this adjustment, turn screw (A) in or out as needed.

RIGHT MARGIN The distance between the *thread of screw* (E) and stop (D) should be .079 for a 10 pitch machine or .099 for a 12 pitch machine. Adjust screw (E) in or out as needed.

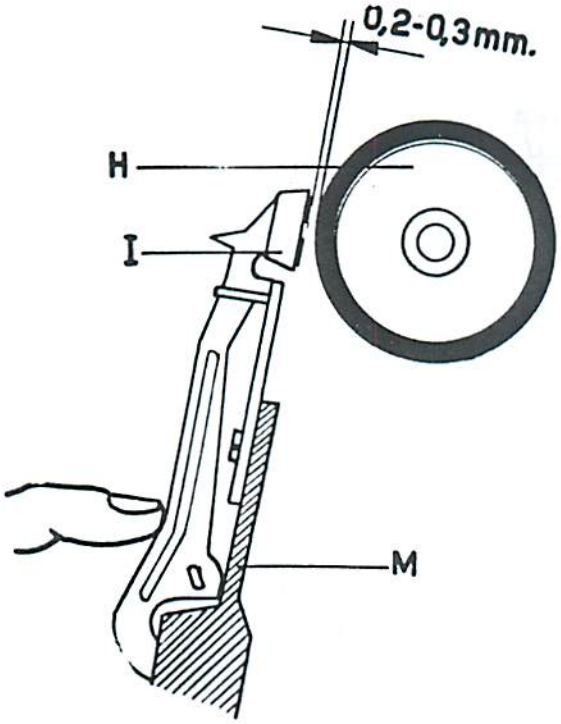
There should be from .004 to .008 between arm (L) and screw (K) when the machine is in the line lock position. Adjust screw (K) in or out as needed.

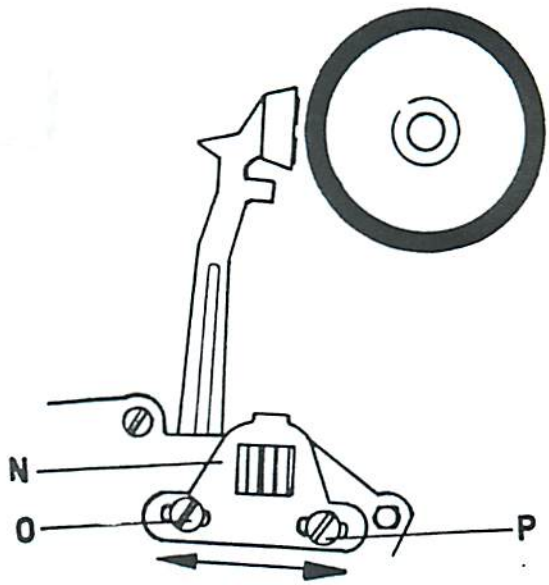
BELL The bell should ring with a loud, crisp sound. Adjust by turning the bell clockwise or counterclockwise.



NOTE: Check the condition of the drawband.

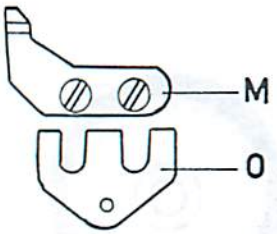
To adjust the mainspring tension, place a screwdriver in the slot of screw (F). Hold this screw so it will not turn or get away from you. Loosen set screw (E). Turn screw (F) until proper tension is obtained. Tighten screw (E).

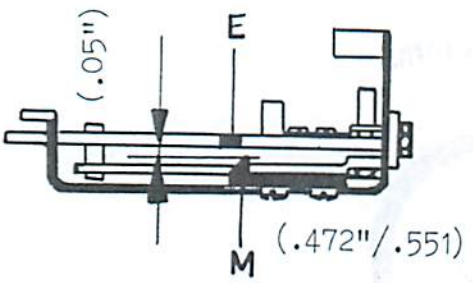


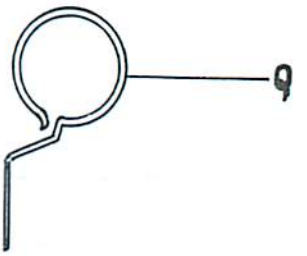


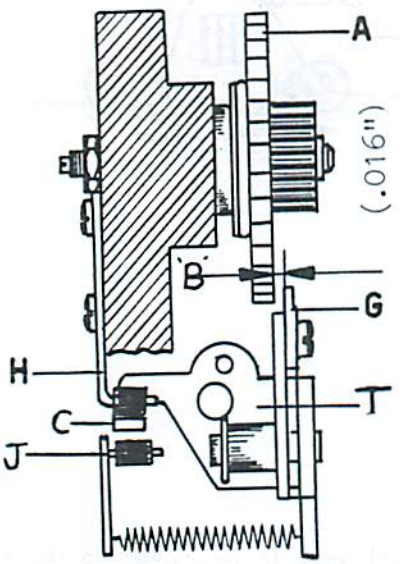
Check the ring and cylinder adjustment with two sheets of paper (.008 clearance). Hold type bar (I) up to the platen and insert two sheets of paper. The paper should have a slight "drag" on it when pulled out. If the paper pulls too tightly, bracket (N) will have to be moved to the rear. If the paper pulls out loosely, move bracket (N) to the front.

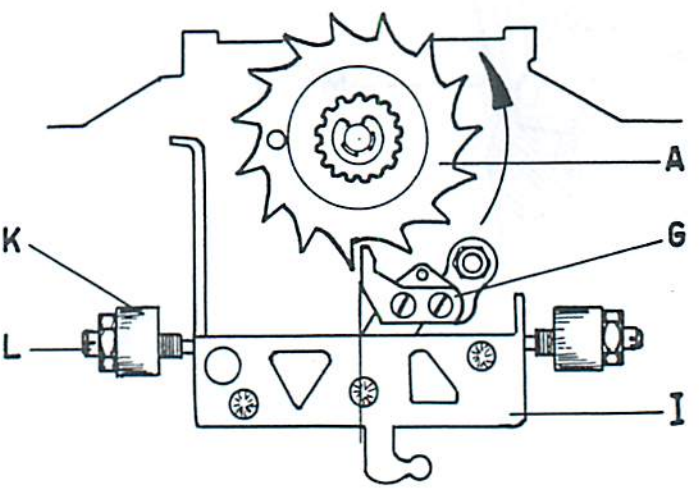
Tighten screws (O) and (P) when the adjustment is completed.











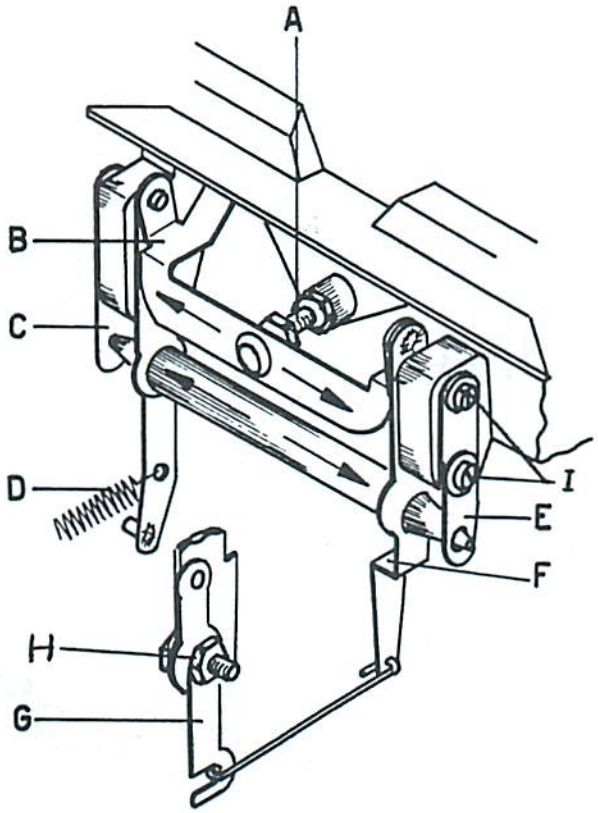
The distance between the loose dog (M) and the rigid dog (E) should be .050. To increase the distance between these two dogs, insert a shim (O) behind the loose dog (M).

The silencer spring (Q) should have enough tension to release the loose dog when the carriage is being returned. Replace spring (Q) to insure proper action.

The rocker (I) should be positioned in such a way that, when the starwheel is in contact with the loose dog, the bottom starwheel tooth is pointed directly downward. To adjust, position rocker (I) with pivot screws (L) left and right.

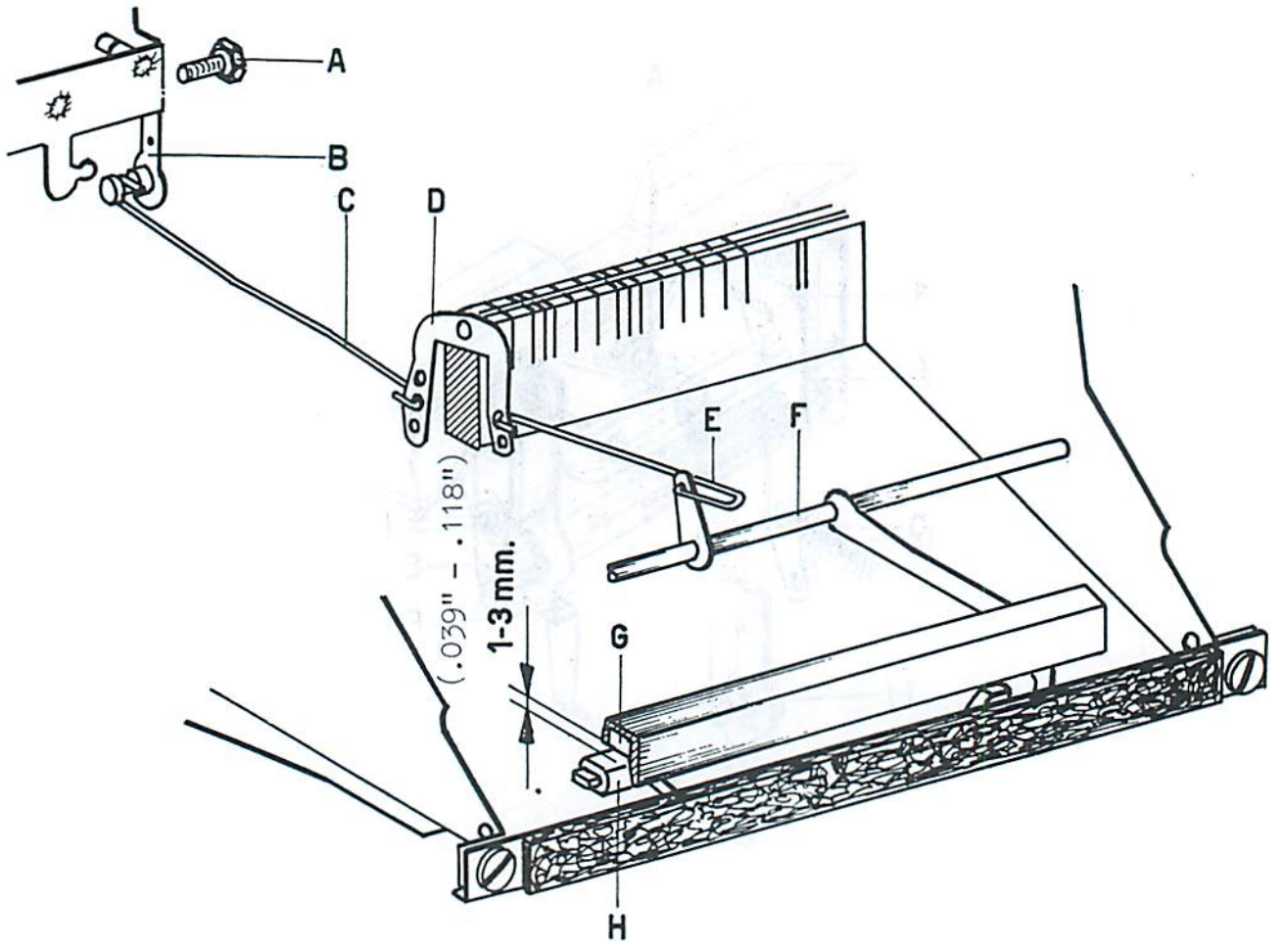
When the rocker is in a neutral position, there should be .016 clearance between the front edge of of starwheel (A) and the back edge of (G), as at (B). To adjust, form the front limit bracket (H) up or down as needed.

After the trip (See Universal Bar – Trip Section) has been adjusted, the back limit must be adjusted. Hold a type bar up to the platen. There should be about .010 clearance between rocker extension (C) and back limit bracket (J). To adjust, form bracket (J) up or down as needed.



TRIP The trip of the Hermes should occur when the type bar is from .079 to .157 from the platen. To adjust, loosen nut (H) and move arm *(G) forward* or rearward as needed.

UNIVERSAL BAR The U bar should be parallel. The type bars should contact the U bar when a type head is 1.181'' from the platen. Adjust with screw (A). The trip should be uniform on both sides and also the center. To adjust, loosen screws (I) and position plate (E) as needed.

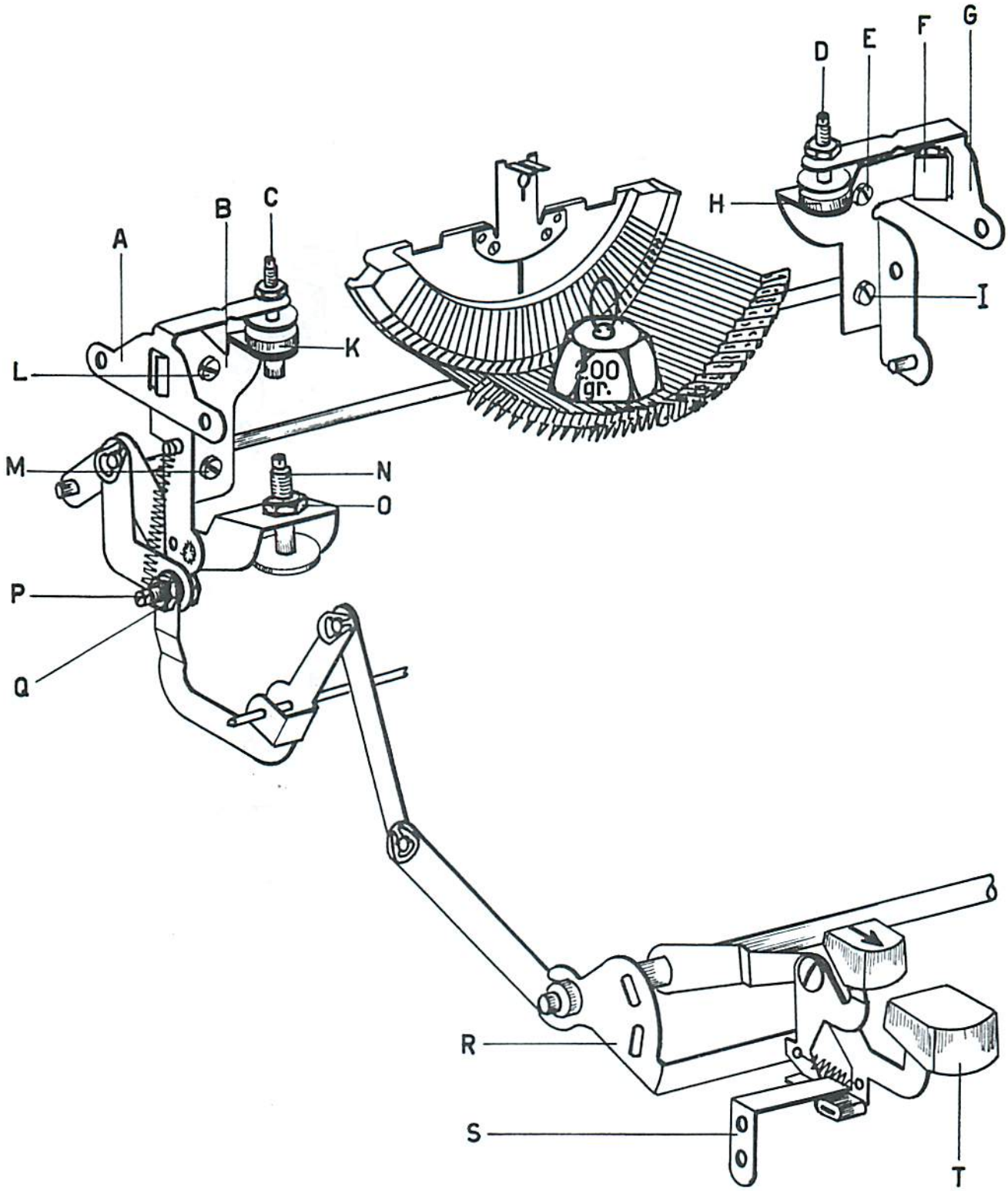


Check that shaft (F) has a small amount of end play. Form the end brackets.

Link (E) should be connected to the top hole of bracket (D).

Link (C) should be connected in the center hole of bracket (D).

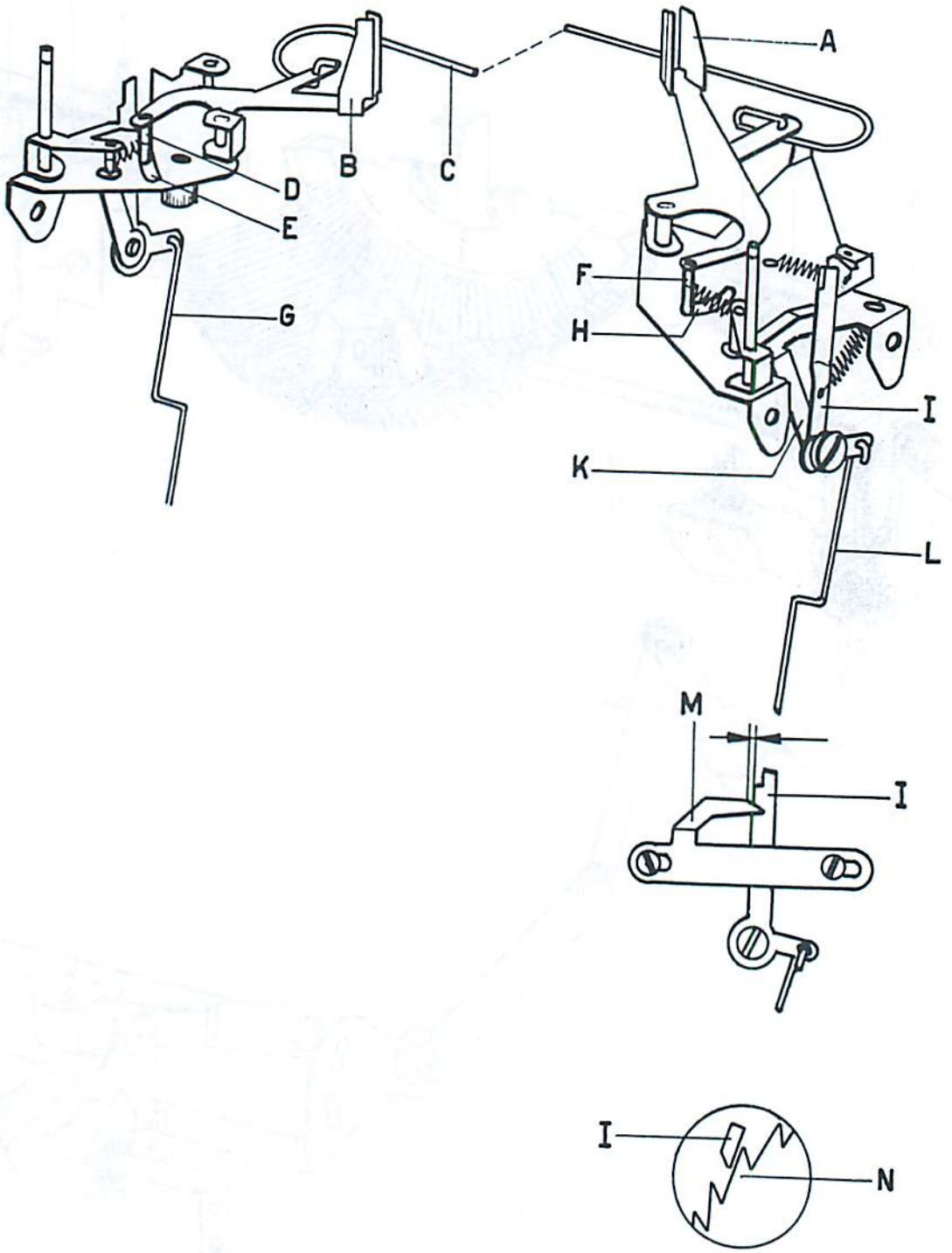
Space bar (G) should trip about .040 to .118 before it hits bottom limit (H). To adjust, loosen screw (A) and adjust arm (B) as needed.



NOTE: CHECK THE RING AND CYLINDER ADJUSTMENT BEFORE ATTEMPTING THIS.

The "on feet" adjustment will be made using capital letters. Loosen nut (O) and turn screw (N) *until the capital* letters are "on feet". Tighten nut (O).

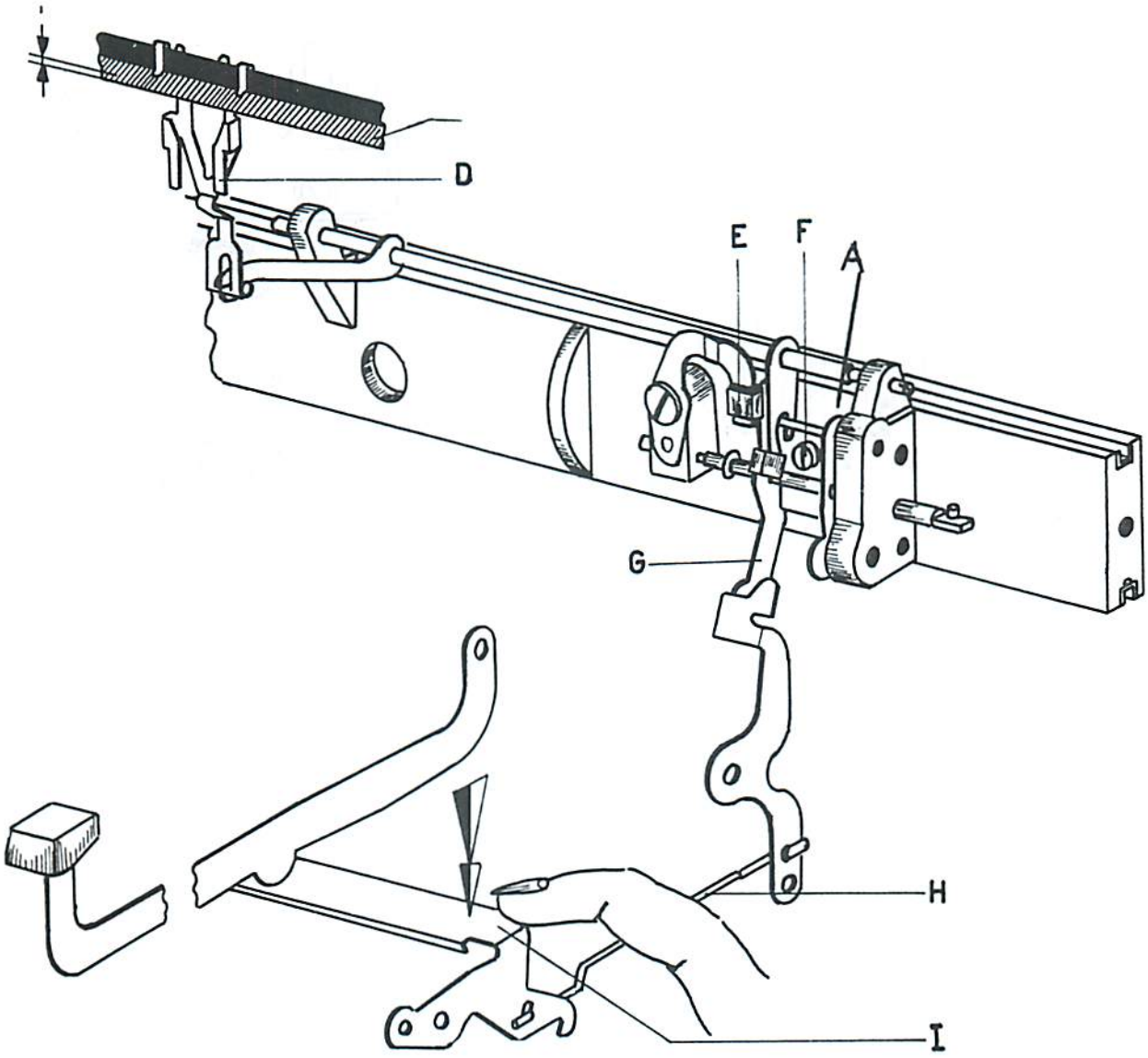
The motion is adjusted by aligning the small letters with the capital letters. Turn screws (C) and (D) until they do not touch the cushions (K) and (H). Adjust eccentric screw (Q) for the motion adjustment. Adjust screws (C) and (D) back down until there is a slight "drag" at stops (K) and (H).



FEED Move a type bar slowly up to the platen. Notice that pawl (I) moves the ratchet wheel (N) 3 or 4 teeth. Check both the left and right ribbon spools. Adjust by forming links (G) or (L) for more or less movement.

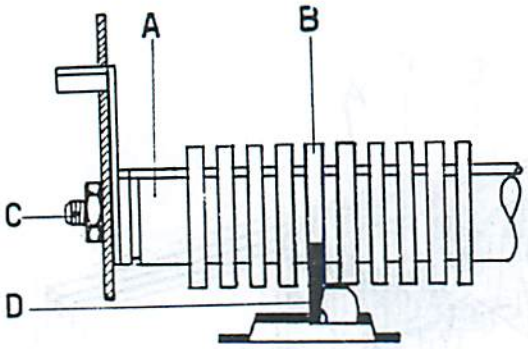
When a key is pressed down there should be a slight clearance between pawl (I) and guide (M). Adjust by forming guide (M) to the left or right.

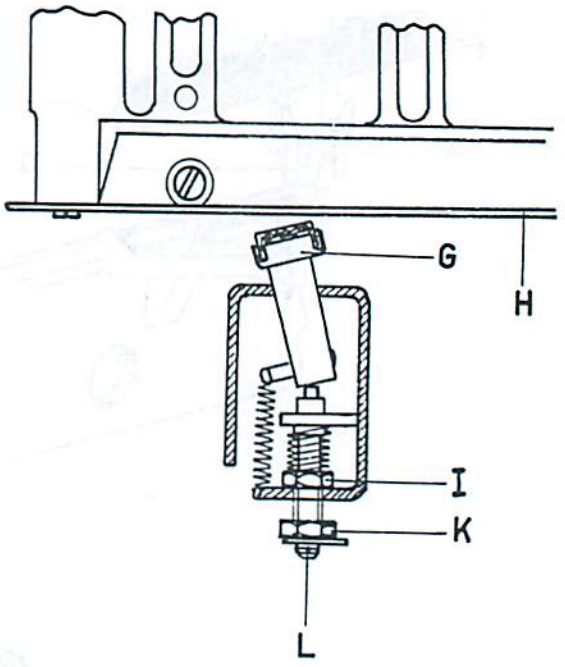
REVERSE The reverse levers (A) and (B) should move freely, and at the same time stops (D) and (F) should rest against the ends of the openings (E) and (H). Adjust by forming link (C) as needed.



THROW Place the ribbon selector in the red position. Hold a type bar up to the platen. The type face should cover the red portion of the ribbon completely. Adjust link (H) by forming, for more or less throw for the ribbon bichrome.

UPSTOP Place the ribbon selector in the red position. Hold a type bar up to the platen. Lever (G) should be resting against stop (E). To adjust, form stop (E) as needed.

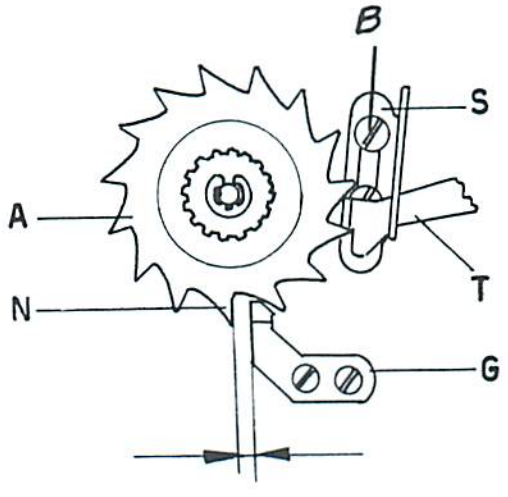




TAB RACK The tabulator rack must pivot freely without any play. Check the screw and nut on either side for proper alignment.

Tab set-clear lever (D) should contact one and only one tab blade at a time. Adjust screw (C) in or out as needed.

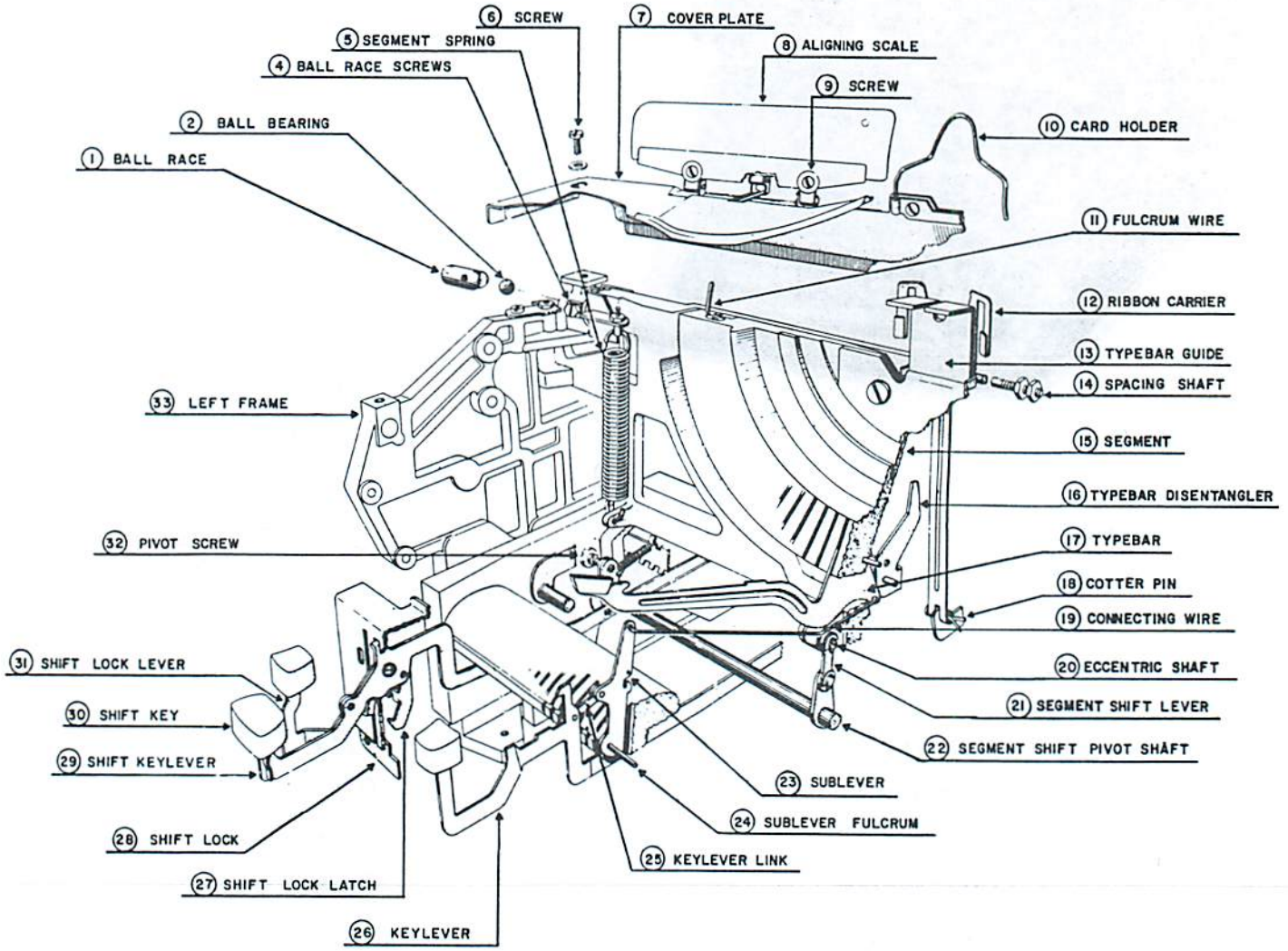
TAB BRAKE The brake (G) must be as close as possible to brake band (H) when the tab bar is in the neutral position. Adjust with nut (I) and screw (K). To adjust the speed of the carriage during tabulation, adjust screw (L). Never oil the brake band.



Depress and hold the back space key down. There should be a clearance of .177 (10 pitch) or .138 (12 pitch) between fixed dog (G) and the star-wheel tooth (N). To adjust, loosen screws (B) and move bracket (S) up or down as needed.

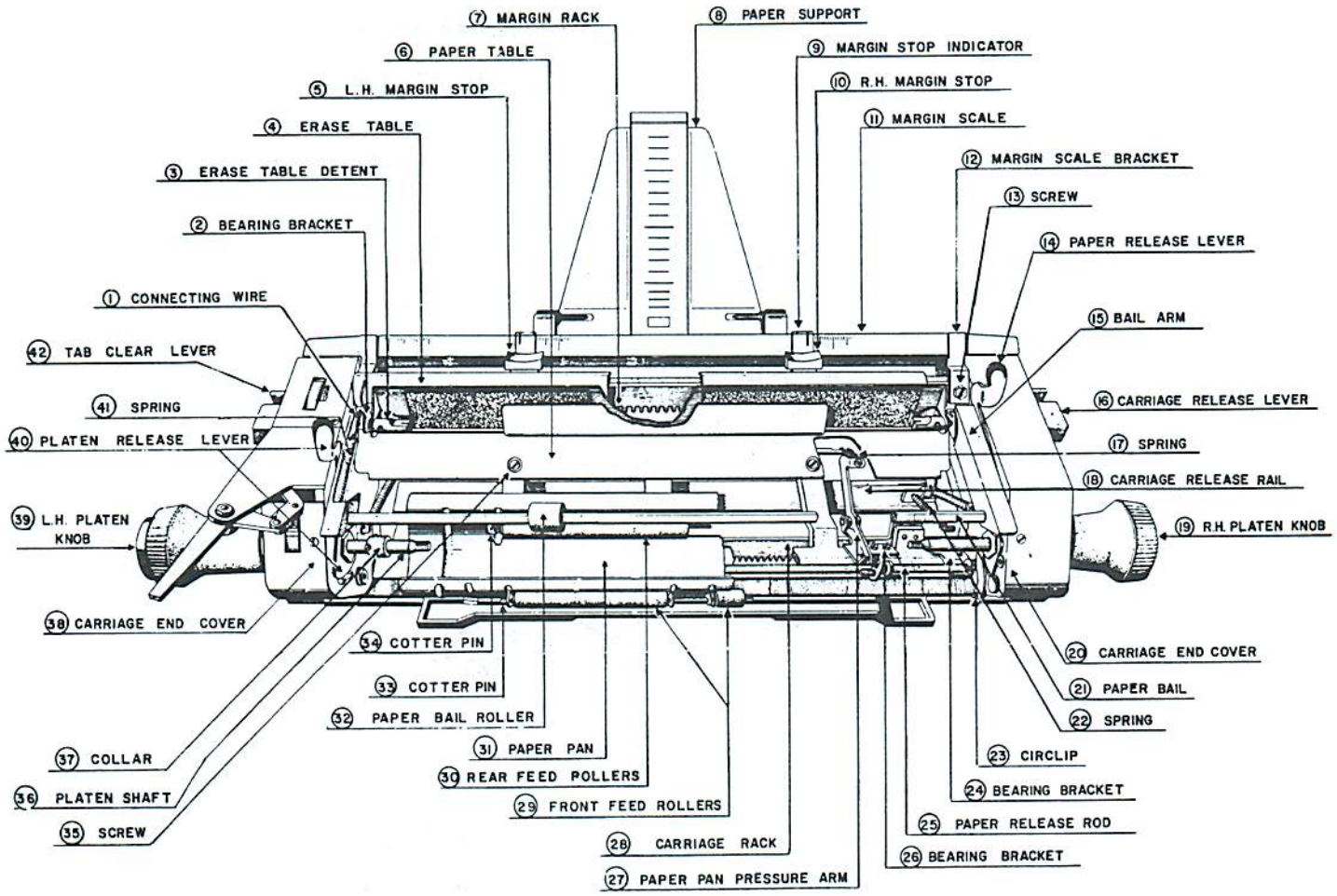
NOTES

SECTION	PAGE
Type Bars & Covers	O – 2
Carriage	O – 3
Line Spacing	O – 4
Paper Injector	O – 5
Margins	O – 6
Ribbon Feed	O – 7
Bichrome	O – 8
Escapement	O – 9
Master Trip	O – 10
On Feet & Motion	O – 11
Tabulator	O – 12
Chart	O – 13



Adjust screws 6 (left and right) so cover plate (7) does not touch front feed rollers (29). The clearance should be about .055.

The aligning scale (8) should be adjusted so that the bottom of all letters should just touch the top of the scale markings. To adjust, loosen screw (9) and move the scale up or down as needed.

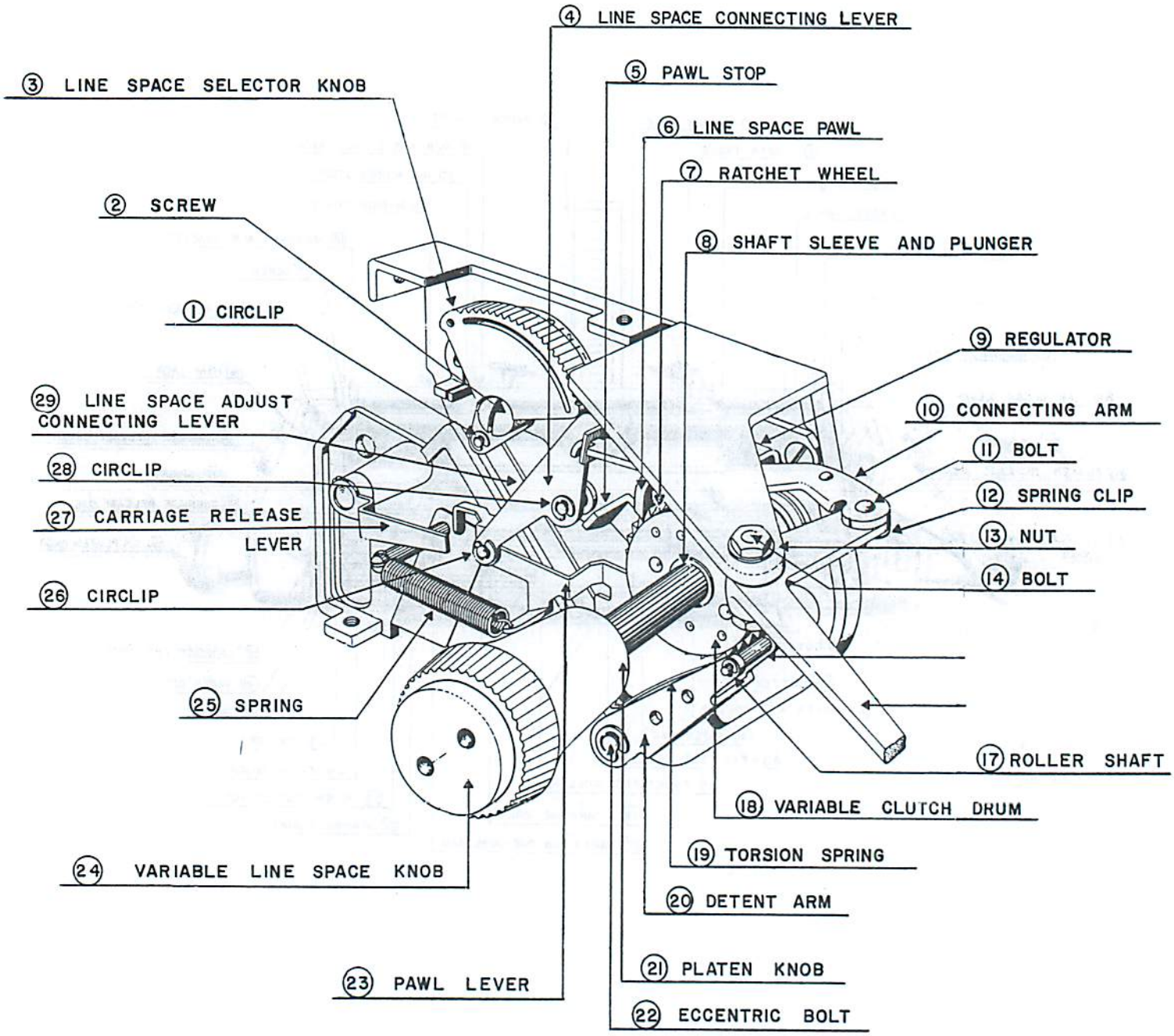


Platen Removal. The platen is removed by turning the two platen knobs. Unscrew the right side first. It may be necessary to use a wrench to hold the right end of the platen when unscrewing the left knob. After the knobs have been removed, lift the platen up and out.

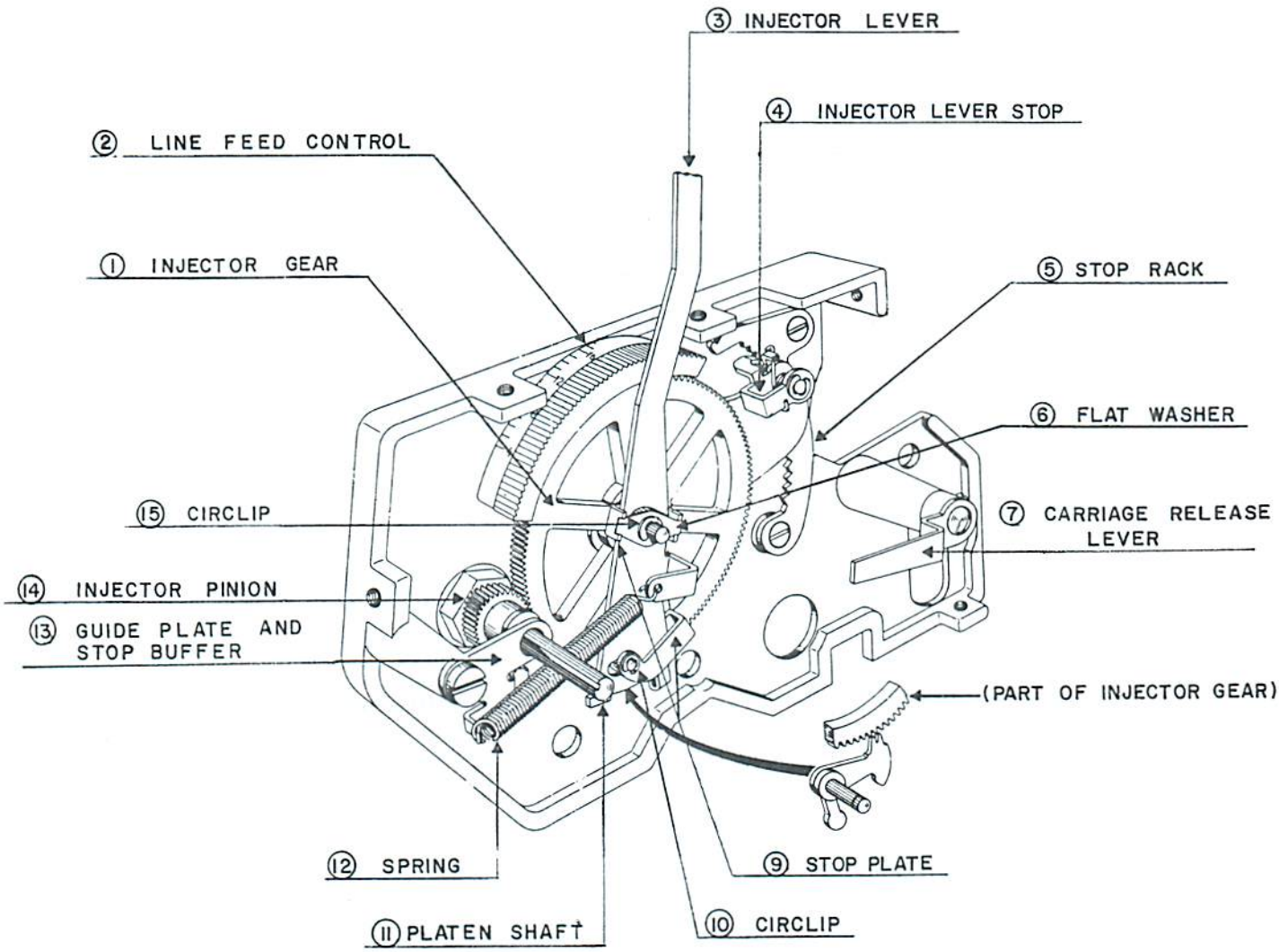
Mainspring. The mainspring should be wound 3 to 5 times before the drawband is connected to it. Attach the drawband to the mainspring.

To remove the carriage from the sub-carriage, center the carriage and measure the distance of each of the 4 ball bearings from the end of the carriage. Remove the 4 screws holding the lower rail to the carriage. Lift the carriage and lower rail up and off from the carriage track. Reverse the procedure for replacing the carriage.

The Ring and Cylinder should be adjusted by removing the carriage and adjusting the right base plate only. Move the right side forward or rearward until there is a slight paper drag on one sheet of paper when held between the type bar and the platen.

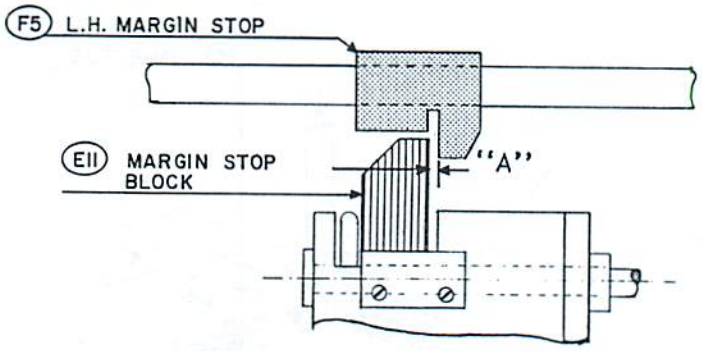


Move the line space lever (16) until the line space pawl (6) is against the pawl stop (5). Turn the mounting nut of the eccentric shaft (22) until the detent roller (15) rests firmly between two teeth of the ratchet wheel (7). The line space pawl (6) must enter the space between two gear teeth exactly at all five line space settings. To adjust for this condition, form the regulator (9) so that the pawl drops into the proper space on the ratchet wheel (7).



The paper injector provides a means to insert papers that are to be typed at the same line position. The correct line position is set by the linefeed control (2). After the paper is inserted, the injector lever (3) is pulled forward to its limit of travel and then released.

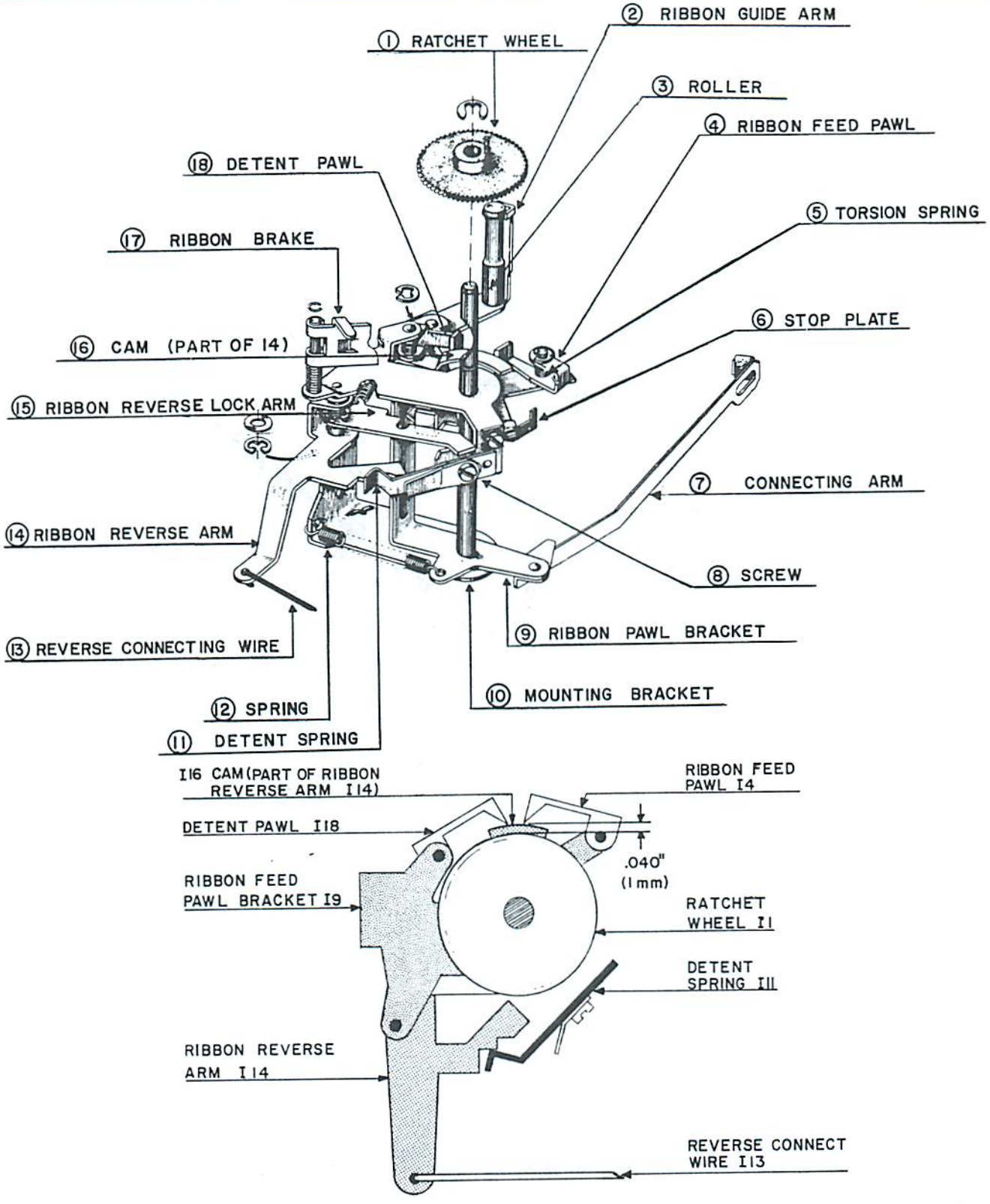
When the lever (3) is forward, the injector gear pawl (8) is pushed upward by the bottom end of the lever. The pawl engages the injector gear (1) and drives it. The injector gear drives the injector pinion (14) that is connected to the platen shaft. The injector lever (3) moves until its stop plate (9) comes in contact with the injector lever stop (4). The lever (3) is then released, at which time it returns to home position. The stop plate (9) contacts the stop buffer (13) that stops the injector lever.



Move the left hand margin stop to the margin stop block (E-11). Allow to engage. Release the margin rack until there is a clearance of .086 to .098 (10 pitch) or .067 to .075 (12 pitch) as at "A".

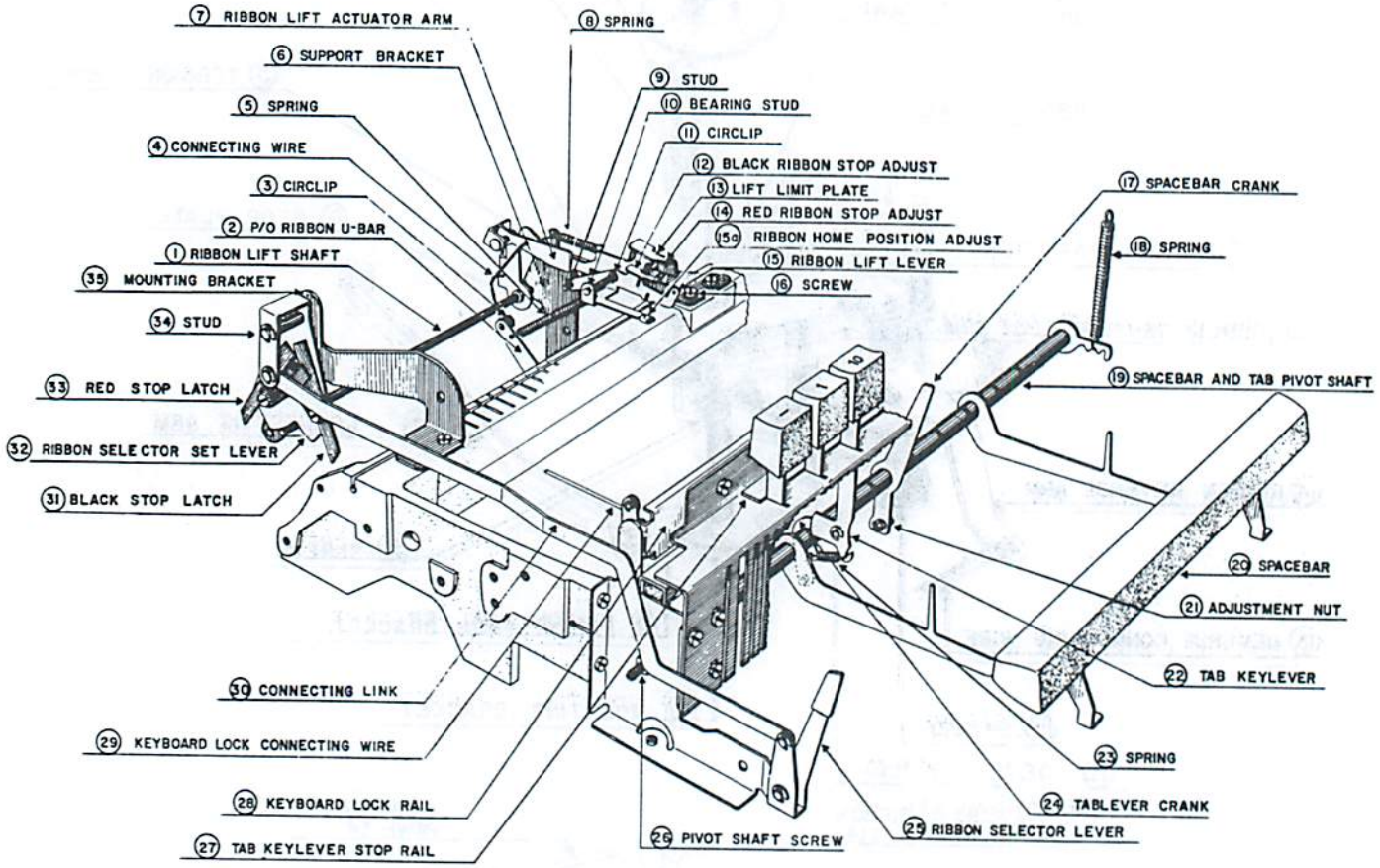
When the left hand margin stop is at the left side of the carriage, the marker on the plastic indicator must correspond to the "0" on the margin scale and on the scale of the paper bail.

Adjust by loosening the 2 screws at the rear of the margin stop. Adjust the right margin in the same manner.



The ribbon feed mechanism is motivated by the ribbon universal bar located under the keylevers. The U bar activates the connecting arm (7) which activates the ribbon pawl bracket (9) which moves the pawl bracket (I-9) and the ribbon feed pawl (I-4) which turns the ratchet wheel (I-1) and winds the ribbon. There should be .040 clearance between the tip of pawl (I-4) and the outer edge of wheel (I-1). To adjust, form spring (I-11) so that arm (I-14) will be properly located.

The ribbon mechanism is reversed by pressure. This pressure will allow reverse arm (I-14) to be forced to the left or right as needed. Check for binds of arm (I-14) and wire (I-13).

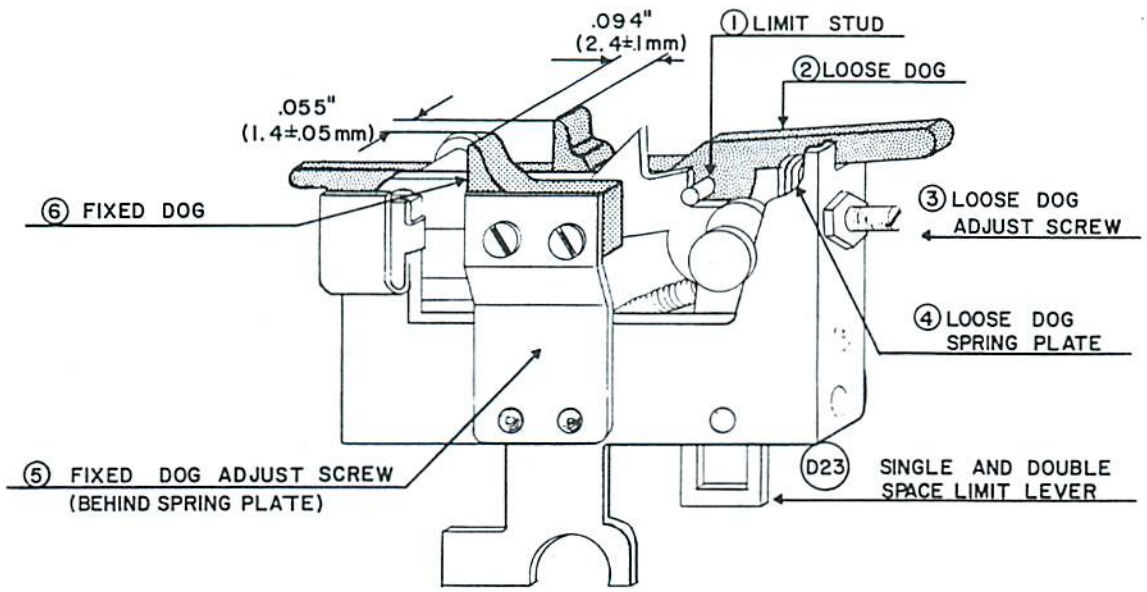


Stencil Position. The ribbon should not be activated in the stencil position. The underscore should be .040 above the top of the ribbon Form the ribbon home position adjustment (15 A). When the ribbon lift arm (7) is activated by the ribbon U bar, the arm should bypass the stud (9) by .004. Adjust by moving the stud (34) in the mounting bracket (35).

Black Position. The underscore should be .040 above the top of the red ribbon. Adjust the black stop latch (31). The stop limit of the ribbon carrier in the black position is adjusted by forming the black ribbon stop (12) to adjust for proper height.

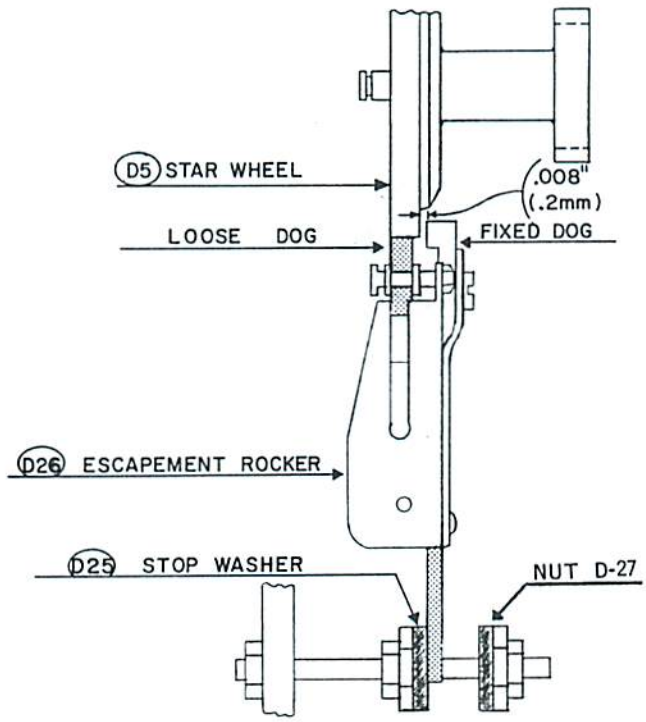
Red Position. When the type bar is not activated, check for .020 to .040 clearance between the bottom of the activator arm (7) and the stud (9). Adjust by forming the connecting wire (4).

The underscore should be .040 above the bottom of the red ribbon. Adjust the red stop latch (33). The stop limit of the ribbon carrier in the red position is adjusted by forming the red ribbon stop (14) to adjust for proper height.



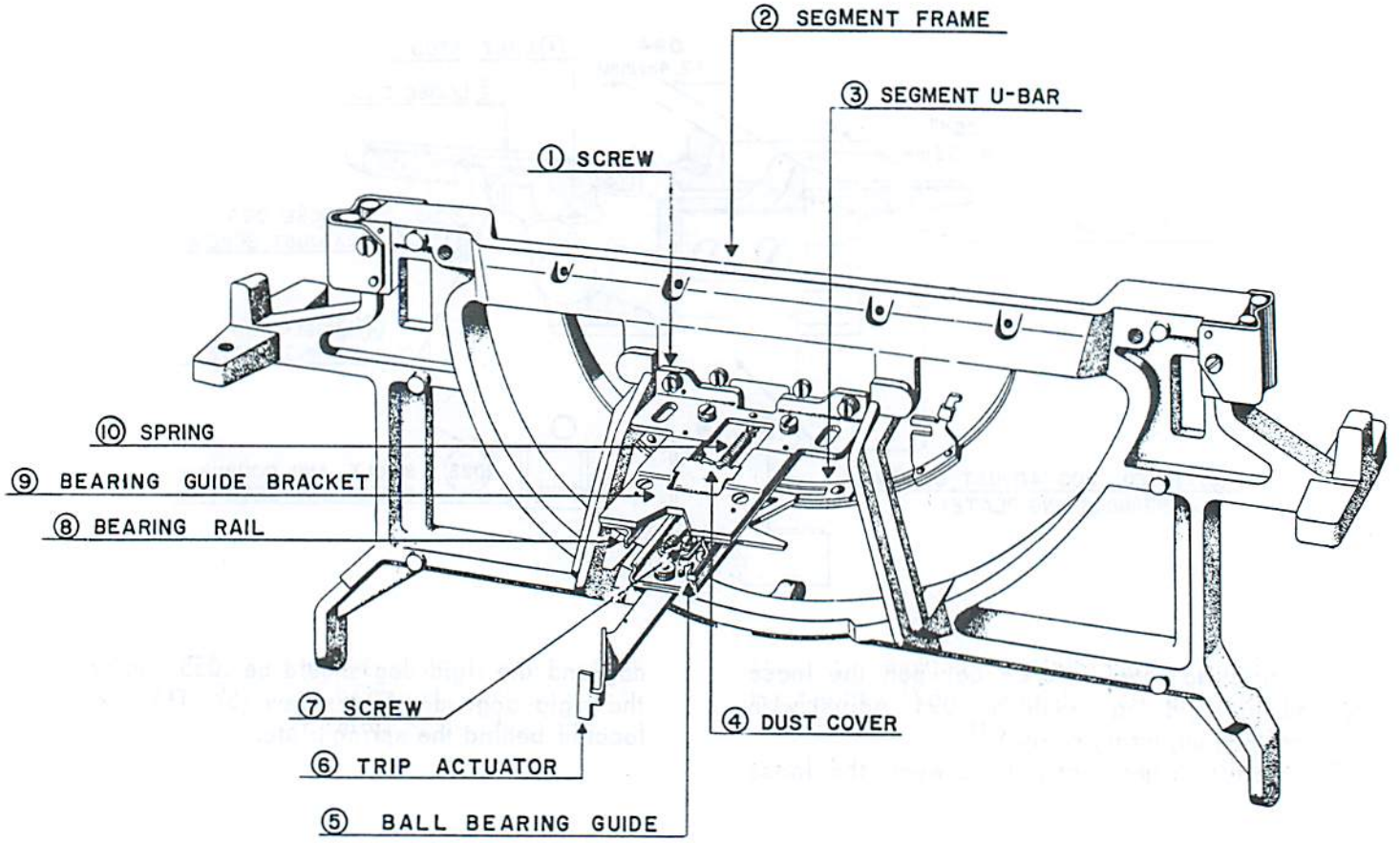
The front to rear distance between the loose dog and the rigid dog should be .094. Adjust with the loose dog adjusting screw (3).

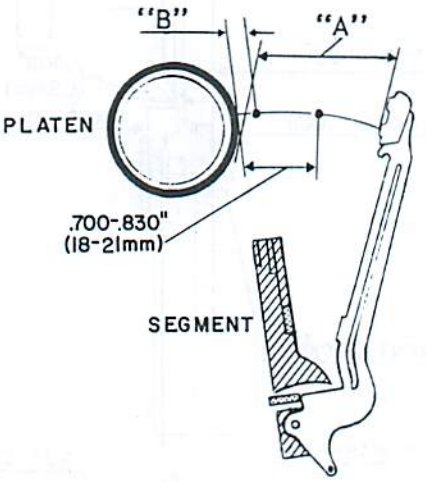
The left to right distance between the loose dog and the rigid dog should be .055. Adjust with the rigid dog adjusting screw (5). This screw is located behind the spring plate.



Front Limit. With the rocker in the rest position, the loose dog should be positioned .008 behind the front face of the starwheel tooth. Adjust nut (D-25) in or out as needed.

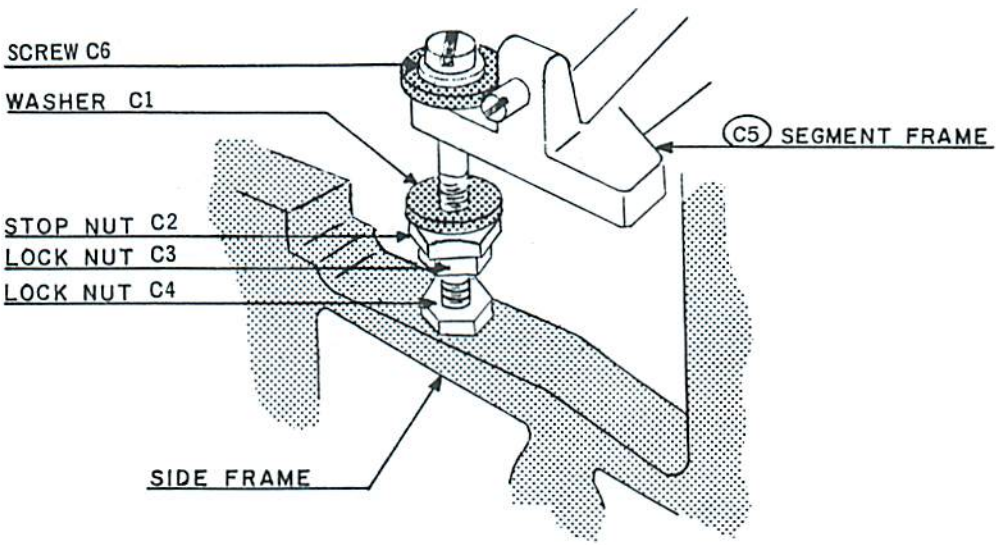
Back Limit. Hold a type bar to the platen. The fixed dog should have a full bite on the starwheel tooth. The front face of the fixed dog should be flush with the front face of the starwheel. Adjust nut (D-27) in or out as needed.





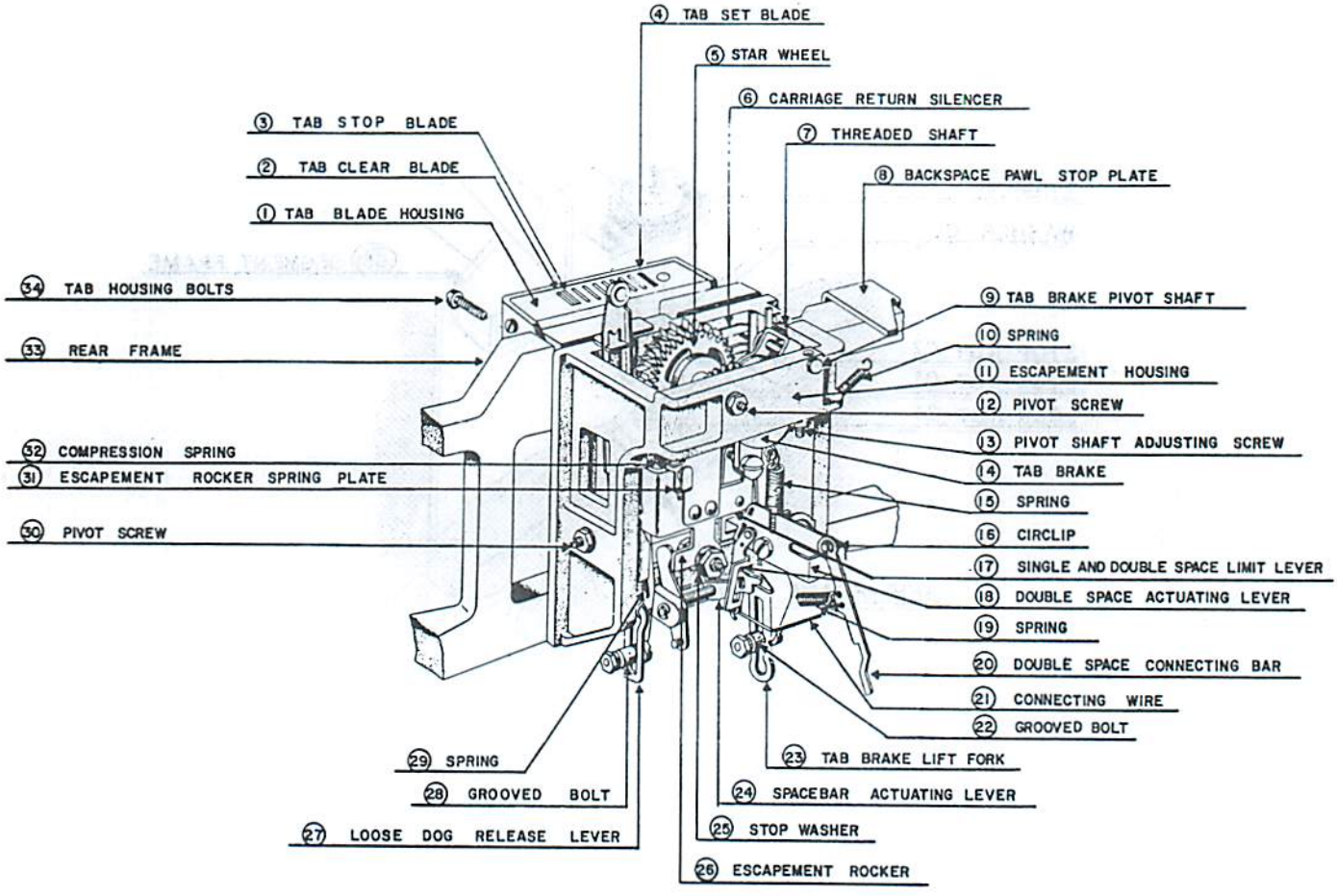
The type bars should contact the universal bar about 1 1/8" to 1 1/4" before they reach the platen, as at "A". The escapement trip should occur when the type bar is about 1/8" from the platen, as at "B".

To adjust, loosen screw (7) and move arm (6) forward or rearward.



The "On feet" and motion of the olympia is adjusted with the lock nuts and screws on the left and right of the segment frame. Using the small letters as the "on feet", loosen lock nut (C-4) and turn screw (C-6) in or out until the tops of the letters are being printed with the same darkness as the bottoms of the letters. Remember to check both the left and right sides. Be sure that you tighten lock nut (C-4) before adjusting the motion.

The motion is adjusted using the capital letters to check. Loosen lock nuts (C-3) left and right. Adjust nuts (C-2) up or down until the bottoms of the capital letters line up perfectly with the bottoms of the small letters. Check both left and right sides of this adjustment. Tighten lock nuts (C-3) left and right. Recheck the "on feet" to be sure that you did not disturb that adjustment.



Tabulator brake. When the tab bar is depressed, the tab brake pinion should mesh with the starwheel pinion by 2/3rds of its width. Adjust by loosening the pivot screw (13) and moving the tab brake pivot shaft (9).

The pinions should also engage to 2/3rds of their depth. Adjust by loosening the grooved bolt (22) and moving the tab brake lift fork (23).

Loose dog release. Loosen the grooved bolt (28) and adjust the loose dog release lever (27) so that the loose dog clears the teeth of the starwheel (5) by .010 to .015 when the tab bar is depressed.

CONVERSION TABLE

Inch-Fractions and Decimals to Millimeter Equivalents

INCHES Fract.	INCHES Dec.	mm	INCHES Fract.	INCHES Dec.	mm	INCHES Fract.	INCHES Dec.	mm	INCHES Fract.	INCHES Dec.	mm
-	.0004	.01	-	.3	7.620	-	.7874	20	-	1.969	50
-	.001	.0250	5/16	.3125	7.938	51/64	.7969	20.241	2	2.000	50.8
-	.0039	.10	-	.3150	8	13/16	.8125	20.638	2 1/8	2.125	54
-	.005	.127	21/64	.3281	8.334	-	.8268	21	-	2.165	55
-	.0079	.2	-	.3346	8.5	53/64	.8281	21.034	2 1/4	2.250	57.2
-	.0098	.25	11/32	.3438	8.731	27/32	.8438	21.431	-	2.362	60
-	.01	.254	-	.3543	9	55/64	.8594	21.828	2 3/8	2.375	60.3
-	.0118	.3	23/64	.3594	9.128	-	.8662	22	2 1/2	2.500	63.5
1/64	.0156	.397	-	.3740	9.5	7/8	.8750	22.225	-	2.559	65
-	.0157	.4	3/8	.375	9.525	57/64	.8906	22.622	2 5/8	2.625	66.7
-	.0197	.5	25/64	.3906	9.922	-	.9	22.860	2 3/4	2.750	69.9
-	.0236	.6	-	.3937	10	-	.9055	23	-	2.756	70
-	.025	.635	-	.4	10.160	29/32	.9063	23.019	2 7/8	2.875	73
-	.0276	.7	13/32	.4062	10.319	59/64	.9219	23.416	-	2.953	75
-	.0295	.75	-	.4134	10.5	15/16	.9375	23.813	3	3.000	76.2
1/32	.0313	.794	27/64	.4219	10.716	-	.9449	24	-	3.150	80
-	.0315	.8	-	.4331	11	61/64	.9531	24.209	3 1/4	3.250	82.6
-	.0354	.9	7/16	.4375	11.113	31/32	.9688	24.606	-	3.346	85
-	.0394	1	29/64	.4531	11.509	-	.9843	25	3 1/2	3.500	88.9
3/64	.0469	1.191	15/32	.4688	11.906	1	1.000	25.400	-	3.543	90
-	.0472	1.2	-	.4724	12	-	1.024	26	-	3.740	95
-	.05	1.270	31/64	.4844	12.303	1 1/16	1.062	26.988	3 3/4	3.750	95.3
-	.0551	1.4	-	.4921	12.5	-	1.063	27	-	3.937	100
-	.0591	1.5	1/2	.5	12.700	-	1.102	28	4	4.000	101.6
1/16	.0625	1.588	-	.5118	13	1 1/8	1.125	28.575	-	4.331	110
-	.0669	1.7	33/64	.5156	13.097	-	1.142	29	4 1/2	4.500	114.3
-	.075	1.905	17/32	.5326	13.494	-	1.181	30	-	4.724	120
5/64	.0781	1.984	-	.5315	13.5	1 3/16	1.188	30.16	5	5.000	127
-	.0787	2	35/64	.5469	13.891	-	1.221	31	-	5.118	130
-	.0906	2.3	-	.5512	14	1 1/4	1.250	31.75	5 1/2	5.500	139.7
3/32	.0938	2.381	9/16	.5625	14.288	-	1.260	32	-	5.512	140
-	.0984	2.5	-	.571	14.5	-	1.299	33	-	5.906	150
-	.1	2.540	37/64	.5781	14.684	1 5/16	1.312	33.34	6	6.000	152.4
-	.1024	2.6	-	.5906	15	-	1.339	34	-	6.299	160
7/64	.1093	2.776	19/32	.5938	15.081	1 3/8	1.375	34.93	6 1/2	6.500	165.1
-	.1181	3	-	.6	15.240	-	1.378	35	7	7.000	177.8
1/8	.125	3.175	39/64	.6094	15.478	-	1.417	36	-	7.087	180
-	.1378	3.5	-	.6103	15.5	1 7/16	1.438	36.51	7 1/2	7.500	190.5
9/64	.1406	3.572	5/8	.6250	15.875	-	1.457	37	-	7.874	200
5/32	.1563	3.969	-	.6299	16	-	1.496	38	8	8.000	203.2
-	.1575	4	41/64	.6406	16.272	1 1/2	1.500	38.10	8 1/2	8.500	215.9
11/64	.1719	4.366	-	.6496	16.5	-	1.535	39	-	8.661	220
-	.1772	4.5	21/32	.6563	16.669	1 9/16	1.562	39.69	9	9.000	228.6
3/16	.1875	4.763	-	.6693	17	-	1.575	40	-	9.449	240
-	.1969	5	43/64	.6719	17.066	-	1.614	41	9 1/2	9.500	241.3
-	.2	5.080	11/16	.6875	17.463	1 5/8	1.625	41.28	-	9.843	250
13/64	.2031	5.159	-	.6890	17.5	-	1.654	42.	10	10.000	254
-	.2165	5.5	-	.7	17.780	1 11/16	1.688	42.86	-	10.236	260
7/32	.2188	5.556	45/64	.7031	17.859	-	1.693	43	11	11.000	279.4
15/64	.2344	5.953	-	.7087	18	-	1.732	44	-	11.024	280
-	.2362	6	23/32	.7188	18.256	1 3/4	1.750	44.45	-	11.811	300
1/4	.25	6.350	-	.7283	18.5	-	1.772	45	12	12.000	304.8

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